MONROE

OFFICE PRACTICE COURSE

THE EDUCATOR
MONROE CALCULATOR

Office Practice Course in Thirty Lessons

for

THE EDUCATOR

MONROE CALCULATOR

Prepared by

Education Department

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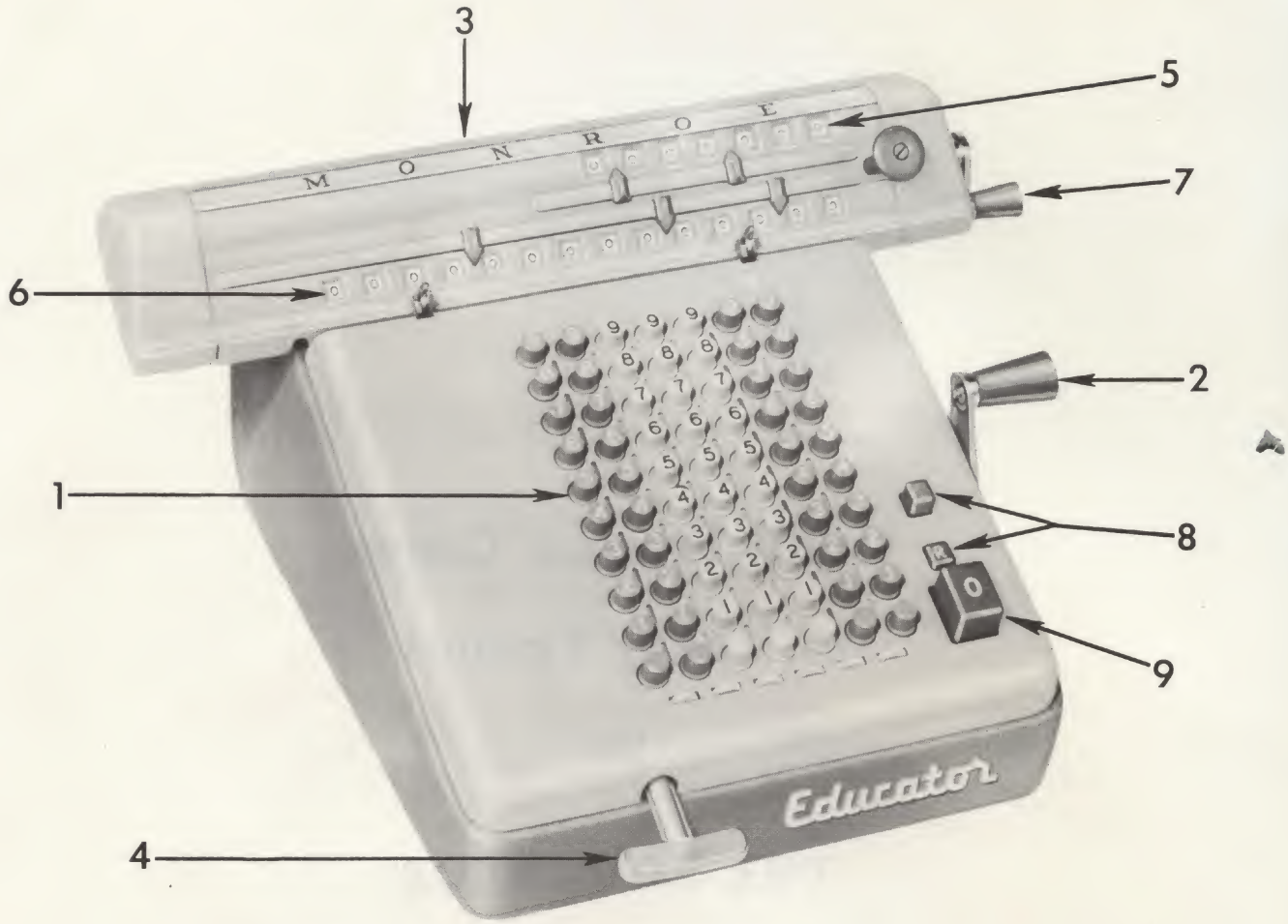

THE EDUCATOR
Monroe Calculator

Principal Operating Parts

1 Keyboard
2 Operating crank
3 Carriage
4 Carriage shift lever
5 Upper dials
6 Lower dials
7 Dials clear-out crank
8 Repeat and non-repeat keys
9 Master clear key

The Educator Monroe Adding-Calculator

General Instructions

The Monroe Adding-Calculator, as its name implies, is an adding and calculating machine capable of performing addition, subtraction, multiplication and division mechanically. Since all arithmetical problems in business are based upon these four fundamentals of arithmetic, you can solve any Business Arithmetical Problem with the Monroe.

The three principal parts of the machine are:

1 **The Keyboard** Used for setting up numbers to be added, subtracted, multiplied or divided.

2 **The Operating Crank** For performing addition and subtraction and repeated forms of each.

3 **The Carriage** At the top of the machine which contains the dials that register the results and proofs of the various operations.

A brief description of all operating features follows:

Keyboard The Monroe keyboard is the standard flexible type. By depressing the keys amounts to be added, subtracted, multiplied or divided are set up. The depressed keys enable you to read the amounts as they are set on the keyboard. An error may be detected and corrected immediately by simply depressing the proper key. This operation automatically restores the key which has been incorrectly depressed in the same column.

Operating Crank This crank is turned away from you one complete revolution for all operations of addition and multiplication.

The crank is turned toward you one complete revolution for all operations of subtraction and division.

The crank must be stopped at the top of any turn - in any other position of the crank the machine is locked preventing depression of keys or movement of carriage. Operate the crank with your right hand with a wrist movement. Do not attempt to use your entire arm to push the crank around, for then it will be difficult to stop it at the top or neutral position. A turn of the wrist automatically stops the crank at the top and in the neutral position.

Carriage The carriage may be moved to right or left as required. The figures in the dials are always in direct vertical alignment with the figures on the keyboard; thus a depressed key in any column will operate the dial in the carriage which is directly above that column.

For nearly all operations of addition and subtraction the normal position of the carriage is to the extreme left with the first right hand dial on the carriage directly over the first row of keys on the right of the keyboard.

Carriage Shift Lever The left hand is used on the carriage shift lever to shift the carriage instantly to the left or right as desired by a half turn of this lever.

If you desire to move the carriage a number of places the right hand is used to raise the carriage with the hand Shifting Knob on the right of the carriage.

Upper Dials The multiplier in multiplication and quotient in division are shown in these dials. Multipliers are registered in black figures and quotients in red.

Lower Dials The result in addition and multiplication, the remainder in subtraction and the dividend in division are shown in these dials.

Dials Clear-out Crank This crank clears the upper dials when turned away from you one complete turn. A complete turn toward you clears the lower dials and in so doing raises the carriage at the same time.

Contrary to the position of the operating crank, previously described, this clear-out crank must remain at the bottom after each turn.

Decimal Markers on Dials These movable markers are set in advance for the number of decimal places required. The number of places is shown to the right of the marker when it is set.

Decimal Markers on Keyboard Placed between each row of keys at the top is a decimal marker which, when turned over shows red indicating the decimal point for the amount set on the keyboard. These and the dials decimal markers are only guides and do not have any mechanical connection with the machine.

Repeat and Non-Repeat Keys When the Repeat Key, marked "R" is depressed the figures set on the keyboard remain locked unless cleared with clear keys. When the non-repeat key, above the repeat key, is depressed the keyboard clears after one revolution of the operating crank. Repeat key must always be depressed for multiplication and division.

Red Column Release Keys Each of these keys clears any key depressed in that column without releasing other depressed keys on the keyboard.

Clear Key The large red key marked 0 when depressed clears the entire keyboard.

Assignment No. 1

Special Instruction

Addition

Addition can be accomplished with the carriage in any position. It is best, however, always to have carriage shifted to the extreme left. Set up amounts on extreme right of keyboard, using the fore and middle fingers of the right hand.

The non-repeat key should be depressed for the first five assignments. After more experience you can allow the repeat key to be depressed thus permitting a check of amount set on keyboard after it is added.

Be sure to turn the operating crank away from you one complete revolution and stop the crank at the top of the turn. Do not have the crank out of that position in setting amount on keyboard.

To set up 458, depress 4 in the third right hand column, 5 in the second column and 8 in the first column.

Do not depress two keys in same column. Write the amount on keyboard in same order as you would on paper.

Subtraction

To subtract on the Monroe you add the larger amount first in accordance with previous instructions.

Then set the smaller amount on the right of the keyboard, and turn the operating crank towards you one complete revolution.

The lower dials will show the remainder. Remember that subtraction is just as simple as addition. The only difference between addition and subtraction is that you turn the operating crank away from you one revolution in addition, and towards you one revolution in subtraction.

Assignment No. 1

Addition

1	2	3	4	5	6	7	8
458	875	132	775	575	876	678	458
693	263	498	564	321	937	879	622
157	151	444	756	259	711	234	125
596	263	133	239	333	492	215	135
954	111	626	185	456	321	167	729
123	233	761	148	492	173	132	854
765	782	379	533	225	288	189	987
934	156	475	462	183	317	171	432
154	134	535	381	693	222	444	512
987	267	345	278	437	384	335	765

9	10	11	12	13	14	15	16
123	376	838	295	673	114	765	841
985	349	147	159	583	646	878	354
987	476	333	297	555	198	515	313
111	212	717	475	398	765	345	165
492	611	355	766	877	555	616	118
163	149	175	626	878	185	222	164
416	726	143	811	362	388	291	184
145	691	765	225	481	983	167	155
567	489	734	761	349	320	835	722
649	451	221	134	455	666	987	654

17	18	19	20	21	22	23	24
395	346	648	987	58.75	3.45	5.26	95.35
649	540	549	523	6.21	15.30	2.35	4.60
724	325	695	746	2.38	1.98	73.83	.99
459	589	564	750	14.80	43.96	.88	1.50
151	387	576	864	5.99	2.56	1.80	23.82
529	970	333	111	43.55	8.20	3.96	15.30
963	751	641	575	.19	7.43	29.82	.87
406	123	579	640	31.25	22.38	.81	6.60
187	875	723	948	2.58	.53	.30	3.25
				.94	83.90	33.11	34.76
				38.75	.88	1.37	.17
				.48	.56	.74	8.35
				23.70	19.40	49.61	62.33
				1.64	3.83	.18	.80
				55.96	.12	23.10	21.46

Assignment No. 1 (Continued)

Subtraction

25	26	27	28	29	30	31
567	1090	876	481	1275	7568	4678
489-	585-	128-	225-	985-	1298-	1987-

32	33	34	35	36
4365	7659	7664	3655.09	1395.60
3497-	4568-	4987-	3.90	8.71
			837.54-	855.09
			8843.21	3550.27-
			3.14	42.05
			5542.98	850.33-
			1358.00	1400.98
			395.72	33.00
			8077.19-	395.36-
			4.20	14.60
			441.27-	385.99
			4427.93	3857.71

Assignment No. 2

Special Instructions

Adding a Constant

For this work depress the Repeat Key
Set the constant figure on keyboard. Turn crank away from you one revolution. It is added
Set on keyboard the first amount. Add same by turning crank away from you.
Turn crank towards you one revolution, thus subtracting first amount and leaving constant still in lower dials
Change keyboard set-up to second amount
Add same; record result. Subtract again and change to third amount
Continue same routine

Subtracting a Constant

Same routine as adding a constant except that constant item is first subtracted from zero. Then first amount is added. Lower dials show difference. Subtract first amount. Change set-up to second amount. Add again, etc. Of course have repeat key set.

Assignment No. 2

Review

1	2	3	4
172	668	355	876
259	291	655	591
21	794	343	878
497	495	461	353
636	97	798	798
410	876	426	487
328	736	725	424
872	624	329	365
663	563	426	399
990	238	726	324

5	6	7	8
31.35	3.46	13.00	3.25
42.50	1.56	35.60	3.10
1.46	21.20	44.30	17.56
23.59	11.16	5.35	11.75
5.62	35.45	27.89	1.48
7.35	.25	21.20	.34
66.75	1.45	3.45	23.45
103.43	54.50	1.67	23.26
35.78	4.38	42.40	4.55
7.11	35.75	15.40	6.07
42.15	12.30	32.30	.38
36.75	25.65	69.04	3.45
61.09	3.50	41.25	1.20
54.02	46.74	41.46	54.67

9	10
9385.83	3.22
93.68	8554.10
3.88	3.51-
938.51-	3965.90
875.33	335.67
85.54	8850.84-
8361.90-	3004.33
9380.32	95.40
3.95-	136.29-
38.61	83.10-
423.00	8514.23
9356.13	3900.21

Addition

11

135.81 + 17.55 =
67.52 + 17.55 =
48.31 + 17.55 =
260.55 + 17.55 =
79.61 + 17.55 =

12

45.62 + 121.47 =
371.46 + 121.47 =
19.32 + 121.47 =
25.75 + 121.47 =
16.48 + 121.47 =

13

84.80 + 3.27 =
17.55 + 3.27 =
435.68 + 3.27 =
79.55 + 3.27 =
66.07 + 3.27 =

Find Total Weight

14	15	16
156	575	165
145	489	173
213	545	154
167	478	167
178	453	182
184	517	179
125	389	155
208	414	214
155	475	174
172	379	162
186	512	169
153	517	158
211	473	177
175	465	168
181	528	175
147		181
177		163
159		171
144		166
173		159
165		148
147		156
		214

Assignment No. 2 (Continued)

Subtraction
Find Net for each and
Total Net

17			18			19		
Gross	Tare	Net	Gross	Tare	Net	Gross	Tare	Net
37840	2375		38450	275		4588	285	
28733	2375		25620	275		3362	285	
16450	2375		18755	275		1475	285	
21530	2375		44850	275		2880	285	
29750	2375		33625	275		2573	285	
134303	11875		161300	1375		14878	1425	

Assignment No. 3

Special Instructions

Multiplication

This process of Arithmetic is just as easy on the Monroe as addition because multiplication is only repeated addition and the machine gives you a proof of what you did.

First be sure the repeat key is down. To multiply 25 x 22. Set 25 on the extreme right of the keyboard. Shift carriage to extreme left.

With pencil and paper you multiply by 2 first. So you do on the machine. Turn operating crank away from you twice. Lower dials show 50. Upper dials show 2 and keyboard shows 25. Therefore, 2 x 25 = 50 and the machine proves your work at this point.

Then with left hand on carriage shift lever move carriage to right one place. The next multiplier is also 2, so turn the crank twice away from you. The lower dials show 550, upper dials show 22 and the keyboard 25 or 25 x 22 = 550.

The proof of your work is not accomplished by refiguring but by comparison of upper dials figure and keyboard amount against the multiplicand and multiplier of the problem. If they agree the lower dials result is correct.

In case the multiplier has three, four or more digits, the method is exactly the same except that the carriage is shifted three, four or more times in accordance with the number of digits.

In case the figure in the multiplier is 8 instead of 2 you turn the crank eight times instead of two. But do not count the turns of the crank. Let the machine count the turns. You watch the upper dials until the desired figure is reached.

Assignment No. 3

Review

1	2	3	4
139	254	24.29	38.27
762	364	15.16	18.24
428	716	41.68	42.79
531	428	39.63	57.28
296	912	23.15	4.29
287	364	15.12	23.56
420	427	4.28	4.87
723	693	16.14	75.95
828	971	34.99	6.56
392	356	55.29	61.25
258	382	73.65	38.27
719	359	11.92	15.16
723	782	92.92	3.21
514	615	25.76	44.63
315	653	32.15	8.67
219	437	19.77	59.45
632	298	42.38	37.21
239	154	21.34	24.66
632	928	35.13	8.52
541	653	18.52	13.67
192	428	53.92	11.42
251	242	9.55	34.28
315	752	48.39	24.37
239	723	12.49	76.32

5

504.88 + 34.17 =
78.40 + 34.17 =
39.25 + 34.17 =
64.55 + 34.17 =
189.17 + 34.17 =

6

217.66 + 5.75 =
129.40 + 5.75 =
6.99 + 5.75 =
53.21 + 5.75 =
49.60 + 5.75 =

7	8
27.55	6.75
38.53	18.44
15.75	3.21
40.80	21.50
56.55	3.88
134.63	79.40
79.22	48.50
648.17	5.22
6.75	7.54
20.54	61.25
7.72	8.38
13.80	9.22
48.91	9.34
3.18	16.51
55.42	7.24
10.77	23.48
38.70	
51.25	
6.53	
17.29	

Multiplication

9 276 x 46 =
10 378 x 34 =
11 543 x 45 =
12 349 x 42 =
13 386 x 51 =
14 275 x 26 =
15 307 x 25 =
16 934 x 16 =
17 546 x 74 =
18 647 x 24 =
19 754 x 180 =
20 647 x 312 =
21 756 x 428 =
22 267 x 271 =
23 764 x 738 =
24 845 x 175 =
25 675 x 233 =
26 533 x 185 =
27 766 x 782 =
28 857 x 141 =

29 6944 x 133 =
30 6944 x 56 =
31 6944 x 64 =
32 6944 x 138 =
33 6944 x 117 =
34 4167 x 220 =
35 4167 x 145 =
36 4167 x 136 =
37 4167 x 214 =
38 4167 x 37 =
39 45833 x 2345 =
40 45833 x 3134 =
41 45833 x 2456 =
42 45833 x 3563 =
43 45833 x 4737 =
44 15625 x 1526 =
45 15625 x 1567 =
46 15625 x 2433 =
47 15625 x 1204 =
48 15625 x 1317 =

Assignment No. 4

Special Instructions

Constant Multiplicand

In any work where a constant amount is to be multiplied by several multipliers the carriage does not have to be cleared after each multiplication.

Set the constant amount on the keyboard. Multiply by the first multiplier and record result. Change the first multiplier in the upper dials by forward and backward turns of the crank to read the second multiplier and then again record the result.

For example, if the first multiplier was 234, it would appear in the upper dials. If the second multiplier was 432, make two crank turns away from you with carriage in third position, then move carriage to first position and subtract twice or turn crank towards you twice. Upper dials will then show 432.

At all times the constant multiplicand is locked on keyboard with repeat key down.

Assignment No. 4

Review

1	2	3	4	5	6
183	467	396	31.35	3.46	13.00
219	356	434	42.50	1.56	35.60
625	563	357	1.46	21.20	44.30
512	212	292	23.59	11.16	5.35
331	428	184	5.62	35.45	27.89
427	546	273	7.35	.25	21.20
521	745	111	66.75	1.45	3.45
626	357	471	103.43	54.50	1.67
187	825	695	35.78	4.38	42.40
151	237	275	7.11	35.75	15.40
911	311	257	42.15	12.30	32.30
423	691	151	36.75	25.65	69.04
327	269	423	61.09	3.50	41.25
621	473	911	54.02	46.74	41.46
843	396	151			
584	434	466			
352	251	345			
619	921	328			
531	215	411			
277	315	516			
954	612	343			
754	487	595			
694	710	208			
293	487	397			
298	276	209			
287	276	352			

7 419 x 316 =
8 550 x 444 =
9 335 x 116 =
10 160 x 497 =
11 926 x 360 =
12 318 x 410 =
13 451 x 341 =
14 496 x 237 =
15 509 x 720 =
16 256 x 438 =
17 164383 x 35250 =
18 164383 x 44550 =
19 164383 x 47725 =
20 164383 x 35725 =
21 164383 x 56750 =
22 194444 x 56000 =
23 194444 x 45600 =
24 194444 x 57550 =
25 194444 x 36750 =
26 194444 x 42350 =

Addition

27

Column Line	A	B	C	D	E	F	G	Total
A	287	872	823	152	345	615	236	
B	395	346	648	353	567	335	863	
C	649	348	538	164	142	164	168	
D	723	324	695	583	350	159	260	
E	459	589	643	165	175	306	505	
F	387	797	864	354	247	359	248	
G	529	453	181	473	672	536	169	
H	963	917	876	809	562	725	175	
J	123	579	654	299	969	463	459	
K	104	913	495	154	570	950	130	

Subtraction

28	29	30	31	32
7905	2002	8617	7303	8335
6856-	1292-	7758-	1692-	6253-

Assignment No. 5

Special Instructions

Subtraction - Overdraft

If you take away a larger number from a smaller one, or subtract a series of items whose total is greater than the series of items added, you have what is called an overdraft or negative balance.

To illustrate -

A	B
35	35
63-	22
999999972	52-
	35
	63-
	999999977

The results produced above are in the lower dials, and these figures are termed the complement of the correct overdraft or negative balance. To read the overdraft correctly copy to the keyboard all the figures appearing in lower dials directly above the keys. In example "A" above you would copy to keyboard 9999972. Then subtract twice and actual overdraft 28 will show in lower dials.

Multiplication - Decimals

The pencil and paper rule for decimal points in multiplication is followed on the Monroe machine, namely, mark off as many places in the result as there are decimal places in multiplier and multiplicand combined. Therefore, the Monroe formula for decimal points on the machine is as follows:

Upper Dials + Keyboard = Lower Dials

Since every decimal multiplication differs as to number of decimals in multiplicand and multiplier it saves time on the Monroe not to set keyboard and carriage decimals individually for each problem but to pre-set for all your work fixed decimals which can accommodate the largest number of decimals you might have in any problem.

For this course of instruction we suggest the fixed decimal set-up be as follows:

Upper Dials	3 Decimals
Keyboard	3 Decimals
Lower Dials	6 Decimals

Assignment No. 5 (Continued)

Then arrange each multiplication so that amounts set on the keyboard are set correctly around the decimal. All whole numbers will be set up in the 4th, 5th, 6th, and 7th columns of the keyboard and all decimals in the 1st, 2nd, and 3rd columns. For example, 25.36 is set on the keyboard as 25.360, the first right hand column of keys not being used.

Place the carriage so that the multipliers will appear correctly pointed off in the upper dials, whole numbers to the left of the third decimal and decimals to the right. In this manner the result will always be pointed off correctly and will be read in the lower dials around the 6th decimal.

Assignment No. 5

Review

1	2	3
371.11	421.62	158.76
58.67	72.17	258.17
4.35	28.16	27.20
51.65	1.80	18.18
126.63	380.58	20.61
149.97	10.00	12.60
37.98	14.98	48.40
266.76	21.72	23.72
26.38	12.46	52.46
515.10	1.80	2.55
80.64	71.17	4.30
112.67	13.25	13.22
233.30	75.87	4.88
112.20	30.64	20.65
59.76	.47	4.65
292.88	71.87	5.35
1.66	43.62	11.76
4.44	39.55	19.32
80.26	19.26	11.83
8.50	179.10	31.14
21.62	33.45	63.43
26.37	12.37	5.92
65.40	4.24	23.42
37.33	14.98	1.83
21.55	6.17	5.99
37.33	50.96	63.09

4	486 x 35 =
5	245 x 32 =
6	322 x 45 =
7	345 x 25 =
8	168 x 43 =
9	856 x 51 =
10	987 x 35 =
11	402 x 46 =
12	369 x 15 =
13	371 x 44 =
14	238 x 27 =
15	632 x 18 =
16	777 x 29 =
17	941 x 44 =
18	627 x 71 =

Addition

19

Debit	Credit	Balance
271.40	47.20	
39.50	53.75	
28.79	14.82	
16.50	25.00	

Addition

20

Debit	Credit	Balance
145.00	10.15	
17.72	22.30	
66.14	7.85	
15.84	6.44	

21

Debit	Credit	Balance
61.50	50.00	
33.40	14.62	
15.89	-----	
72.45	35.00	

22

53.75	45.50	
41.50	6.83	
89.74	17.55	
36.15	12.47	

23

48.15	16.17	
113.83	33.48	
6.51	17.92	
12.35	8.54	

Assignment No. 5 (Continued)

Subtraction

24	25	26	27	28
67.25	17.22	55.00	2.85	33.95
5.84-	4.44	6.75-	43.40	10.71
17.65	25.80-	4.30	12.00-	52.20-
75.00	6.55	18.41	11.50-	9.89
14.95	19.80	61.33-	7.63	24.46
32.25-	11.66	7.18	32.76-	57.52-
5.45	38.77-	9.88	1.50	25.17

Multiplication

29 3.812 x 8.875 =
30 61.625 x 2.54 =
31 6.062 x 4.125 =
32 9.25 x 8.5 =
33 10.333 x 9. =
34 .188 x 11.75 =
35 22.125 x 5. =
36 .667 x .625 =
37 13.563 x 18. =
38 34.417 x .375 =
39 13.583 x 21.75 =
40 49.625 x 8.52 =
41 16.75 x 6.125 =
42 23.083 x 5.375 =
43 33.917 x 1.25 =

Assignment No. 6

Test No. 1

Addition

1

678
879
234
215
167
132
189
171
444
335

2

458
622
125
135
729
854
987
432
512
765

3

26.50
4.45
31.10
23.89
5.57
6.25
31.45
4.17
7.85
16.40
22.60
31.37
32.56
32.37

4

5.35
31.57
32.43
5.65
7.80
6.47
8.59
31.00
23.12
4.95
22.76
25.00
31.75
26.00

5

25.17
31.67
6.42
15.27
3.38
22.41
21.00
4.89
3.76
6.75
21.48
21.58
4.35
22.98

6

19.10
22.19
24.32
3.95
6.61
8.50
21.25
3.35
21.57
21.42
27.06
5.37
4.49
7.50

7

217.66 + 5.75 =
129.40 + 5.75 =
6.99 + 5.75 =
53.21 + 5.75 =
49.60 + 5.75 =

8

378.95 + 27.39 =
26.97 + 27.39 =
175.40 + 27.39 =
102.69 + 27.39 =
20.55 + 27.39 =

Subtraction

9

Gross	Tare	Net
13620	462	
24731	462	
18450	462	
36114	462	
43520	462	
136435	2310	

10

Gross	Tare	Net
27533	1554	
35015	1554	
14761	1554	
8593	1554	
24625	1554	
110527	7770	

11

1500.75
245.90
182.55-
426.70
2500.85-
8.90-
16.75

12

824.00
152.30-
415.75-
50.70-
250.00-
8.90
17.75

13

Debit	Credit	Balance
77.24	25.66	
44.26	18.88	
57.55	32.61	
8.76	25.00	

14

Debit	Credit	Balance
54.10	18.92	
77.25	44.50	
36.66	28.50	
112.42	75.00	

15

Debit	Credit	Balance
111.35	47.55	
62.88	51.39	
6.40	17.45	
5.15	21.70	

Assignment No. 6 (Continued)

Multiplication

16 238 x 27 =
17 632 x 18 =
18 777 x 29 =
19 941 x 44 =
20 627 x 71 =
21 345 x 23 =
22 473 x 93 =
23 644 x 19 =
24 793 x 28 =
25 875 x 19 =

26 4167 x 220 =
27 4167 x 145 =
28 4167 x 136 =
29 4167 x 214 =
30 4167 x 37 =
31 7.833 x 41.25 =
32 .938 x 7.5 =
33 8.417 x .125 =
34 23.375 x 4.875 =
35 19.583 x 261 =

Assignment No. 7

Special Instructions

Compound Addition

In Assignment No. 5 Special Instructions, we illustrated a complement in arriving at an overdraft. A complement of a number is that number which, added to the number itself equals 10, 100, 1000 etc. For example the complement of 4 is 6, because 6 and 4 are 10. The complement of 74 is 26 because the sum of the two equals 100. The complement of 235 is 765 because together they total 1000.

Hours and minutes, feet and inches, pounds and ounces can be set on the keyboard and added simultaneously and the minutes reduced to hours, inches to feet and ounces to pounds by using the COMPLEMENTS of ounces in a pound, inches in a foot, etc.

Place decimal at 4 on keyboard
Place decimal at 4 in lower dials

Example

Keyboard	Lbs.		Ozs.
Set pounds to left of Decimal at 4	50.	00	10
Set ounces in right hand columns	51.	00	14
Add both with one turn of operating crank	48.	00	13
Be sure to depress repeat key	52.	00	15
	51.	00	11
	53.	00	12
	305.	00	75
Set the complement of 16 oz. (84) on the right of keyboard with two 9s at the left			9984
With forward turns of crank add until you reduce the number of ounces to less than 16. Result 309 lbs. 11 oz.	309.	00	11

Feet and Inches

13.0009	Set Complement of	
16.0008	12 on keyboard	
21.0007	with two 9s	9988
22.0011		
19.0004	With crank reduce	
26.0003	inches to feet	120.0006
117.0042		

Assignment No. 7 (Continued)

Hours and Minutes

5.0050	Set complement of	
7.0045	60 on keyboard	
12.0017	with two 9s	9940
15.0024		
9.0038	With crank reduce	
17.0029	minutes to hours	68.0023
65.0203		

Other problems which fit Compound Addition are pounds and bushels, pieces and dozens, pieces and gross, pence and shillings, shillings and pounds, etc.

Accumulative Multiplication

For checking purposes where extensions have already been made it is possible to check the total and prove each item without clearing the lower dials after each extension.

Multiply in usual manner comparing amounts on keyboard and upper dials with required factors but do not clear the lower dials. After all items have been calculated the lower dials will show accumulated result of all extensions.

Fractions

On a calculating machine all fractions are handled in multiplication and division particularly by setting up the decimal equivalent of the fraction. For example, the decimal equivalent of $\frac{1}{4}$ is 1.000 ÷ 4. or .25, the decimal equivalent of $\frac{3}{4}$ is 3.000 ÷ 4 or .75, the decimal equivalent of 1/8 is 1.000 ÷ 8 or .125 etc. Decimal equivalents, eighths and twelfths should be memorized after sufficient use of the table.

Since all fractions are decimal equivalents on a calculator you can see the value of knowing decimal point handling and the Monroe method of fixed decimal points.

Assignment No. 7

Review

	Debit	Credit	Balance
1	271.40	47.20	
	39.50	53.75	
	28.79	14.82	
	16.50	25.00	
2	145.00	10.15	
	17.72	22.30	
	66.14	7.85	
	15.84	6.44	
3	61.50	50.00	
	33.40	14.62	
	15.89	-----	
	72.45	35.00	
4	53.75	45.50	
	41.50	6.83	
	89.74	17.55	
	36.15	12.47	
5	48.15	16.17	
	113.83	33.48	
	6.51	17.92	
	12.35	8.54	

6	7	8	9	10
34.61	111.16	89.31	54.88	96.25
71.37	43.50	276.50	72.52	137.50
90.42-	67.83-	97.66-	115.75-	303.04-
1.82	87.28-	34.39	42.42	25.50
28.96-	2.76	169.91-	87.50-	34.20
15.92	5.65	233.00-	17.30	156.85
1.70	14.58-	65.65	3.39	167.33-

11	7.188	x	26.	=
12	69.063	x	14.75	=
13	5.938	x	31.375	=
14	57.125	x	3.25	=
15	.313	x	4.111	=
16	6.438	x	8.055	=
17	.562	x	2.14	=
18	1.688	x	6.40	=
19	.812	x	5.75	=
20	.875	x	1.52	=
21	.083	x	25.25	=
22	.625	x	13.	=
23	62.062	x	7.125	=
24	3.938	x	8.5	=
25	51.75	x	.875	=

Compound Addition

26		27		28	
Hrs.	Min.	Ft.	In.	Lbs.	Ozs.
8	35	5	5	63	12
7	15	7	6	47	11
7	45	8	2	38	7
8	25	20	7	56	8
8	55	18	11	45	10

29		30	
Hrs.	Min.	Ft.	In.
9	10	16	5
8	30	9	3
10	45	12	10
9	35	13	8
8	50	11	9

Multiplication

31	32
456 x 123	398 x 79
734 x 211	850 x 121
456 x 425	575 x 484
368 x 118	764 x 763
571 x 320	591 x 324

Total Only

Assignment No. 7 (Continued)

33	34	35	36
473 x 926	33.652 x 21.50	42.921 x 20.87	41.673 x 89.23
384 x 265	45.633 x 16.61	63.836 x 48.39	31.250 x 10.05
395 x 238	76.804 x 10.83	64.101 x 93.85	58.725 x 23.04
643 x 639	21.156 x 17.77	73.612 x 20.11	33.980 x 17.29
756 x 179	20.334 x 70.29	38.674 x 98.06	19.332 x 74.01

Total Only

Fractions

Memorize Decimal equivalents of Eighths and Twelfths

Eighths

1/8	-	.125
2/8	-	.25
3/8	-	.375
4/8	-	.5
5/8	-	.625
6/8	-	.75
7/8	-	.875

Twelfths

1/12	-	.0833
2/12	-	.1667
3/12	-	.25
4/12	-	.3333
5/12	-	.4167
6/12	-	.5
7/12	-	.5833
8/12	-	.6667
9/12	-	.75
10/12	-	.8333
11/12	-	.9167

Assignment No. 8

Special Instructions

Double Multiplication

Provided the figures are not too large one number may be multiplied by two numbers in one operation.

Place decimal at 0 in upper dials
Place decimal at 5 and 0 on keyboard
Place decimal at 5 and 0 in lower dials

Example

Multiply 75 and 18 by 43

Set 75 on the left of keyboard at 5th decimal
Set 18 on the right of keyboard. Multiply by 43
The result of 75 multiplied by 43 = 3225 at decimal in lower dials.
Result of 18 multiplied by 43 = 774 on right of lower dials.

Assignment No. 8

Review

1 Oral Review of Decimal Equivalents of Eighth and Twelfth Fractions.

2

Lbs.	Ozs.
76	4
84	5
57	6
29	13
65	15

3

yds.	ft.	in.
4	2	10
7	2	8
12	1	9
13	2	5
18	1	7

4

yds.	ft.	in
59	2	5
72	1	4
35	2	3
46	1	4
15	2	3

5

yds.	ft.	in.
13	2	10
81	1	0
4	2	11
60	0	9
14	2	7
5	1	8

6

yds.	ft.	in.
11	1	6
37	2	7
23	0	9
6	2	10
14	2	8
9	1	5

7

385 x 175
376 x 237
626 x 179
756 x 181
642 x 817

8

746 x 173
656 x 817
546 x 826
472 x 123
375 x 185

9

66.143 x 29.37
14.274 x 89.85
13.202 x 14.44
12.595 x 33.33
57.644 x 10.91

10

70.484 x 18.94
93.945 x 12.60
46.859 x 14.23
67.594 x 20.40
21.306 x 16.18

Total
Only

Multiplication (Fractions)

11 24 5/12 x 3 1/3 =
12 18 3/8 x 5 1/6 =
13 25 1/8 x 14 1/2 =
14 33 2/3 x 28 5/8 =
15 67 1/4 x 15 3/4 =
16 58 1/2 x 43 5/6 =
17 16 1/3 x 22 7/12 =
18 35 1/16 x 88 4/12 =
19 72 3/12 x 46 10/12 =
20 64 1/4 x 52 7/8 =
21 64 and 36 x 17 =
22 37 and 25 x 19 =
23 54 and 41 x 22 =
24 79 and 34 x 15 =
25 68 and 47 x 26 =
26 84 and 19 x 33 =
27 46 and 27 x 14 =
28 57 and 38 x 27 =
29 66 and 23 x 40 =
30 45 and 34 x 18 =
31 37 and 23 x 12 =
32 48 and 17 x 33 =
33 79 and 43 x 29 =
34 85 and 64 x 24 =
35 63 and 42 x 16 =

Assignment No. 9

Special Instructions

Subtractive Multiplication

On the Monroe machine it is possible to multiply two groups of figures with multiplier and multiplicand in each group and simultaneously subtract the result for one group from the result of the other group.

For example (25 x 36) - (31 x 22) = 218

First multiply 36 x 25 and the result is 900. This is handled in the usual manner. Then, without clearing lower dials, set on keyboard 31 and multiply by 22 with backward turns of the crank, as if you were performing subtraction. Automatically the lower dials show the result 218, because 31 x 22 = 682 and 900 - 682 = 218.

Discounts

In order that you understand discounts a few definitions are given.

1. List Prices Prices of articles manufactured or sold, which have not yet had any discount deducted
2. Net Prices Prices of articles manufactured or sold after all discounts have been deducted
3. Trade Discount A percentage or series of percentages to be deducted from the list price or list value
4. Cash Discount A percentage allowed for the payment of a bill by a given date
5. List Value The value of a group of items or one item on an invoice before discounts are deducted
6. Net Value The value of a group of items or one item on an invoice after discounts are deducted

Percentages or discounts in percentage form are handled as decimals on a Monroe Calculator. For example, 25% is handled on the machine as .25, 37½% is considered as .375 etc.

Place decimal at 3 in upper dials
Place decimal at 3 on keyboard
Place decimal at 6 in lower dials

Example

$45.25 List Value less 15% Discount

Set 45.250 on keyboard. Multiply by 1.000 in upper dials, which adds 45.25 in lower dials. Multiply by .150 with backward turns of crank so that upper dials will show 1.150 and the .15 will appear in red. The lower dials will show the net value 38.462500 or $38.46.

Assignment No. 9

Review

1 Oral Review of Decimal Equivalents

2 45 10/12 x 16 5/6 =
3 70 1/6 x 22 1/12 =
4 86 4/8 x 6 1/8 =
5 72 1/12 x 3 3/4 =
6 87 1/2 x 29 =
7 41 11/12 x 15 3/8 =
8 7/12 x 52 =
9 28 x 1/12 =
10 5/8 x 5/6 =
11 62 10/12 x 5/12 =

12 54 and 36 x 21 =
13 66 and 45 x 15 =
14 49 and 22 x 17 =
15 75 and 55 x 28 =
16 83 and 16 x 33 =
17 87 and 35 x 42 =
18 65 and 52 x 35 =
19 79 and 34 x 22 =
20 88 and 57 x 18 =
21 55 and 44 x 29 =

22	**23**	**24**
275.70	3.52	524.67
51.37	21.64	157.68
189.25	456.97	455.68
761.32	159.19	15.12
56.17	60.38	986.39
345.74	759.30	175.76
182.65	28.22	874.30
48.29	431.20	56.76
273.42	94.18	381.82
55.17	641.30	93.14
641.55	585.75	175.45
96.31	.85	52.20
344.87	928.38	15.74
687.59	17.39	161.38
43.31	32.22	82.75
77.72	185.10	46.83
212.29	41.39	171.12
485.96	926.41	19.61
96.31	3.62	687.23
597.91	946.84	163.78
42.91	14.38	27.92

Assignment No. 9 (Continued)

Multiplication (Subtractive)

25 (34.75 x .28) - (15.21 x .05) =
26 (61.40 x 17.) - (4.35 x .06) =
27 (54.89 x 32.) - (89. x .12) =
28 (1724. x .45) - (156. x 33.) =
29 (637. x .26) - (3.41 x .18) =
30 (132.80 x 15.) - (56.12 x 1.21) =
31 (16.74 x 79.) - (3.63 x .35) =
32 (44.35 x .63) - (17.81 x .05) =
33 (680.40 x .14) - (35.56 x .71) =
34 (25.38 x 62.) - (1.88 x 85.) =

Discounts

35 $125.75 less 5% =
36 301.50 less 15% =
37 175.00 less 12% =
38 283.40 less 20% =
39 461.38 less 18% =
40 583.45 less 21% =
41 221.63 less 30% =
42 604.21 less 33% =
43 790.50 less 45% =
44 15.84 less 12% =

Assignment No. 10

Special Instructions

Chain Discounts Deducted Singly

A chain discount is a series of trade discounts to be deducted one at a time from the list price or list value. For example $102.60 less 50-10-5%. In accordance with Discount Instructions in Assignment No. 9 we first deduct 50% which leaves 51.30 in lower dials. Clear upper dials only and copy 51.30 to keyboard.

Then without multiplying by 1.000, because it is already in the lower dials, multiply subtractively by .100. The result in lower dials is 46.17. Copy that amount to keyboard and multiply subtractively by the last discount .050. The lower dials show the net value 43.861500 or $43.86.

Division

On the Monroe division is performed with the same ease, simplicity and directness as multiplication. As multiplication is a process of repeated additions and is accomplished with forward turns of the operating crank, so division is a process of repeated subtractions and is accomplished with backward turns of the operating crank.

Example 50481 ÷ 237 = 213

Set the dividend, 50481 on extreme right of keyboard and add it into the lower dials. The "1" which appears in the first upper dials must then be cleared out. Be sure that the Repeat Key is down.

Set the divisor 237 on right of keyboard. Move the carriage to the right two places or until it is in direct alignment with 504, the first trial dividend. Turn the operating crank towards you until 504 is less than 237. You turn the crank twice. The remainder is 3081. Shift carriage once to the left.

The new trial dividend is 308. Subtract once. The remainder is 711, and 1 appears in red in the second upper dial. The new dividend is 711. Subtract until the dividend is less than the divisor. The result in the upper dials is 3 and the lower dials are clear. The final quotient 213 appears in the upper dials.

At any time that the divisor is subtracted too many times a bell rings and it is necessary to turn the crank forward until the bell rings again, clearing out the 9s which appear in the lower dials when any over-subtraction is made.

Assignment No. 10

Review

1 Oral Review of Decimal Equivalents

2	**3**
1371.10	7305.89
1229.49	2831.69
728.20	314.20
27.35	16.72
8992.36	56.90
755.74	136.44
3842.45	3428.65
3947.21	684.29
2783.29	74.15
1972.48	122.89
3821.17	385.72
98.42	471.59
3.85	3.82
6412.75	183.86
163.92	85.40
38.28	1724.51
8329.16	382.11
7621.69	8731.90
6.28	3748.28
2996.81	52.87
372.56	1983.47
2463.89	1284.50
58.91	29.67
2834.79	135.17
721.53	12.76

4 (343.70 x 5.) - (1530. x .04) =
5 (58.65 x .21) - (6.75 x .37) =
6 (127.44 x 9.) - (937. x .22) =
7 (65.13 x 45.) - (1421. x .17) =
8 (174.68 x .32) - (87.5 x .54) =
9 (586.3 x .15) - (74.30 x .30) =
10 (129.44 x 8.) - (68.17 x .16) =
11 (481. x .75) - (155. x .31) =
12 (33.47 x .19) - (4.78 x .52) =
13 (869. x .47) - (321. x .68) =

14 $ 48.33 less 5% =
15 56.75 less 25% =
16 921.06 less 79% =
17 364.80 less 55% =
18 445.00 less 29% =
19 765.30 less 12½% =
20 321.44 less 35% =
21 17.50 less 6½% =
22 450.35 less 9% =
23 1561.34 less 2½% =

Chain Discounts

24 $370.15 less 10-10-2% =
25 163.40 less 15-5 =
26 575.00 less 20-10-10 =
27 28.79 less 5-2½ =
28 13.44 less 33-5 =
29 148.32 less 10-10-10 =
30 365.00 less 25-10-2½ =
31 121.80 less 75-5-2 =
32 435.75 less 20-10-5 =
33 607.50 less 5-5-2½ =

Division

34 50481 ÷ 237 =
35 56561 ÷ 347 =
36 43605 ÷ 459 =
37 95953 ÷ 793 =
38 75636 ÷ 573 =
39 67837 ÷ 865 =
40 59632 ÷ 795 =
41 75836 ÷ 897 =
42 52138 ÷ 173 =
43 37154 ÷ 269 =

Assignment No. 11

General Review

1

Debit	Credit	Balance
77.24	25.66	
44.26	18.88	
57.55	32.61	
8.76	25.00	

2

Debit	Credit	Balance
54.10	18.92	
77.25	44.50	
36.66	28.50	
112.42	75.00	

3

Debit	Credit	Balance
111.35	47.55	
62.88	51.39	
6.40	17.45	
5.15	21.70	

4

Yds.	Ft.	In.
45	1	5
13	2	1
27	1	8
14	2	9
65	1	5
14	2	9

5

Yds.	Ft.	In.
37	1	9
4	2	11
6	2	8
26	1	5
13	2	9
9	1	4

6

Gross	Tare	Net
57830	1725	
62543	1725	
21075	1725	
62470	1725	
33680	1725	
237598	8625	

7

Gross	Tare	Net
17840	850	
9586	850	
23745	850	
18652	850	
21570	850	
91393	4250	

8

1500.75
245.90
182.55-
426.70
2500.85-
8.90-
16.75

9

824.00
152.30-
415.75-
50.70-
250.00-
8.90
17.75

10 7.833 x 41.25 =
11 .937 x 7.5 =
12 8.417 x .125 =
13 23.375 x 4.875 =
14 19.583 x 261. =
15 6944 x 133 =
16 6944 x 56 =
17 6944 x 64 =
18 6944 x 138 =
19 6944 x 117 =

20

70.484 x 18.94
93.945 x 12.60
46.859 x 14.23
67.594 x 20.40
21.306 x 16.18

Total Only

21 71 and 54 x 28 =
22 69 and 39 x 47 =
23 47 and 18 x 35 =
24 78 and 43 x 9 =
25 89 and 36 x 48 =

26 (127.44 x 9.) - (937. x .22) =
27 (65.13 x 45.) - (1421. x .17) =
28 (174.68 x .32) - (87.5 x .54) =
29 $125.87 less 22½-10-5 =
30 591.53 less 45-2½ =
31 17.91 less 15-5 =
32 38.47 less 10-10-10-10 =

33 187.65 less 42½-5 =
34 345687 ÷ 4789 =
35 248795 ÷ 3847 =
36 438648 ÷ 5963 =
37 764598 ÷ 5271 =
38 498321 ÷ 8728 =

Assignment No. 12

Test No. 2

1 Write the Decimal Equivalents of the following fractions

a - 3/4 =
b - 7/8 =
c - 1/8 =
d - 5/6 =
e - 10/12 =
f - 5/12 =
g - 1/6 =
h - 5/8 =
j - 1/2 =
k - 1/12 =

2

Gross	Tare	Net
27452	2255	
33720	2255	
18645	2255	
23722	2255	
14635	2255	
118174	11275	

3

Gross	Tare	Net
35850	1875	
38745	1875	
26680	1875	
19735	1875	
45755	1875	
166765	9375	

4

Lbs.	Ozs.
76	4
84	5
57	6
29	13
65	15

5

yds.	ft.	in.
4	2	10
7	2	8
12	1	9
13	2	5
18	1	7

6

yds.	ft.	in.
59	2	5
72	1	4
35	2	3
46	1	4
15	2	3

Total Only

7

2367 x 204 =
1728 x 248 =
2254 x 967 =
1432 x 482 =
1654 x 389 =

8

70.484 x 18.94 =
93.945 x 12.60 =
46.859 x 14.23 =
67.594 x 20.40 =
21.306 x 16.18 =

Total Only

9 41 11/12 x 15 3/8 =
10 7/12 x 52 =
11 28 x 1/12 =
12 5/8 x 5/6 =
13 62 10/12 x 5/12 =
14 71 and 54 x 28 =
15 69 and 39 x 47 =
16 47 and 18 x 35 =
17 78 and 43 x 9 =
18 89 and 36 x 48 =

19 (489.61 x .25) - (161.44 x .28) =
20 (266. x .88) - (394.00 x .16) =
21 $390.84 less 5-5-5% =
22 548.65 less 10-2½% =
23 9.73 less 25-10-10 =
24 77.11 less 5-5-2 =
25 39.36 less 35-7½ =
26 50481 ÷ 237 =
27 56561 ÷ 347 =
28 43605 ÷ 459 =
29 95953 ÷ 793 =
30 75636 ÷ 573 =

Assignment No. 13

Special Instructions

Multiplication - Short Cuts

When a multiplier is a number containing 7s, 8s, or 9s, as for example, 39, 198, 997, the multiplication may be accomplished by a combined use of forward and backward turns of the operating crank, thus reducing considerably the number of revolutions required by the regular method.

Example 2146 x 198 = 424908

Set 2146 on the right of the keyboard, shift the carriage two places to the right and with forward turns of the crank multiply by 2. In other words multiply 2146 by 200. Then shift the carriage to the left two places, and with backward turns subtract 2. The answer 424908 is in the lower dials and the multiplier appears in the upper dials 202. The final 2 is in red, indication that 2 has been subtracted from 200 giving a multiplier of 198.

This solution is a real short cut because you have taken only four turns of the operating crank instead of 18 turns if you had multiplied directly by 198.

Other examples are a multiplier of 88, where you would multiply by 100 and subtract 12. This makes four turns of the crank instead of 16 turns.

Multiplication - Dial Transfer

In any problem where three factors are to be multiplied savings in carriage clearance can be made by dial transfer, for example:

Example 24 x 13 x 55 = 17160

Multiply in the usual manner 24 by 13. Clear the upper dials only. The lower dials show 312 which is to be multiplied by 55. Since 312 is already in the lower dials once, which is the equivalent of being multiplied by 1, set 54 on the keyboard instead of 55.

Move the carriage so that the right hand figure on the keyboard is in line with the left hand figure of the amount in the lower dials. Then multiply by 312. The figure 312 has now been transferred to the upper dials as proof of the multiplier and the lower dials show the result 17160.

Assignment No. 13

Review

1 Oral Review of Decimal Equivalents

2 $471.88 less 62-5-2½ =
3 35.62 " 10-10-5 =
4 109.70 " 15-10-5 =
5 66.45 " 37½-5 =
6 936.45 " 7½-5-2½ =
7 334075 ÷ 6372 =
8 151626 ÷ 2240 =
9 143825 ÷ 4167 =
10 626728 ÷ 2268 =
11 705220 ÷ 1095 =

Multiplication (Short Cuts)

12 345 x 91 =
13 563 x 18 =
14 254 x 17 =
15 456 x 58 =
16 445 x 82 =
17 326 x 288 =
18 567 x 198 =
19 664 x 387 =
20 453 x 195 =
21 459 x 548 =
22 434 x 769 =
23 644 x 392 =
24 575 x 777 =
25 461 x 108 =
26 656 x 297 =
27 660 x 185 =
28 563 x 752 =
29 155 x 207 =
30 540 x 138 =
31 365 x 491 =

Multiplication (Dial Transfer)

32 725 x 17 x 1944 =
33 433 x 15 x 1638 =
34 125 x 31 x 1875 =
35 638 x 16 x 1729 =
36 217 x 8 x 1883 =
37 344 x 32 x 1952 =
38 236 x 14 x 1301 =
39 478 x 25 x 1352 =
40 194 x 19 x 1404 =
41 425 x 61 x 1643 =
42 294 x 43 x 2003 =
43 471 x 39 x 2037 =
44 864 x 62 x 1541 =
45 242 x 91 x 1386 =
46 375 x 37 x 1506 =

Assignment No. 14

Special Instructions

Chain Discounts Table Whenever chain discounts predominate in invoice figuring it is advisable to use a table furnished with the Monroe machine. This table furnishes the equivalents for varied chains of discounts which when multiplied by the gross amount of the invoice give the net.

Example $6.50 less 50-10-10-5% = $2.50

Looking at the card, you will find that the equivalent for 50-10-10-5% is .38475. Multiply 6.50 by .38475 and the lower dials show the net of the invoice $2.50.

If chain discount table is not available or does not show any equivalent for the desired chain, equivalents can be obtained by discounting $1.00 by the chain percentages. For example: discounting $1.00 by 15-3-6-2% = .75953.

Division - Decimals The Monroe basic rule for decimals is the same for division as previously outlined for multiplication, namely, Upper Dials + Keyboard = Lower Dials. The first decimal to be set is that for the upper dials. We know, for example, how many decimal places we need in the quotient. Since the quotient appears in the upper dials we set the decimal at 3 if we need three decimals in the quotient.

We also know the number of decimals in the divisor which will be set on the keyboard. Therefore, if there are two decimals in the divisor, we set 2 decimals on the keyboard.

The sum of 2 and 3 = 5 so the lower dials decimal will be at 5. When the dividend is added in the lower dials it must be added in relation to the decimal at 5, setting the dividend on the keyboard and placing the carriage in such a position that when it is added all whole numbers will appear to the left of the decimal in the lower dials at 5 and all decimals to the right.

It is also advisable to use the fixed decimal point system previously explained for multiplication and the same set up for almost all of the work in this course can be used; namely, Upper Dials 3, Keyboard 3, Lower Dials 6.

In business it is frequently necessary to find out the percentage of one number to another, or, express the relationship of numbers to each other in percentage form. For example, $6.00 is one half of $12.00. Expressing that relationship in percentage we can say that $6.00 is 50% of $12.00 because 50% is one half of 100%. And on the Monroe machine 50% would appear as .50.

Assignment No. 14

If $6.00 is one half of $12.00 it is also true that $3.00 is one quarter of $12.00 or in percentage $3.00 is 25% of $12.00. This percentage relation can be quickly determined for any amount by dividing one number by the other. It is difficult to determine which number should be the dividend and which the divisor.

There is one rule to use which never fails and which makes it easy to determine the number to use as a divisor. To illustrate, let us return to our previously mentioned examples:

What % is $6.00 of $12.00?
What % is $3.00 of $12.00?

Notice which amount is preceded by the word "of." Namely, $12.00. Therefore that number is the divisor. If you divide $6.00 by $12.00 and $12.00 is the divisor, your quotient is .50 or 50%. Again if you divide $3.00 by $12.00, the amount preceded by the word "of," the quotient is .25 or 25%.

Therefore: What % is $231.65 of $831.53?
What % is $110.50 of $530.00?

In example 1, $831.53 is the divisor and in example 2, $530.00 is the divisor because both amounts are preceded by "of."

Percentages are therefore handled just the same as any example in division.

Assignment No. 14

Review

1 571 x 374 =
2 543 x 670 =
3 556 x 647 =
4 581 x 209 =
5 326 x 817 =
6 1255 x 8771 =
7 4588 x 1699 =
8 6496 x 7389 =
9 6544 x 1728 =
10 3379 x 1750 =
11 2577 x 8519 =
12 2257 x 1088 =
13 4756 x 3988 =
14 3267 x 8510 =
15 4555 x 4985 =

16 555 x 46 x 1626 =
17 447 x 23 x 1113 =
18 231 x 17 x 1147 =
19 764 x 29 x 1729 =
20 653 x 30 x 1232 =
21 2575 x 7 x 1128 =
22 4508 x 5 x 1232 =
23 1750 x 24 x 1284 =
24 1987 x 37 x 1371 =
25 5650 x 38 x 1458 =

Discounts

26 $145.50 less 15-10-5% =
27 360.40 " 25-5 =
28 214.80 " 37½-10-5 =
29 531.25 " 15-7½-2½ =
30 73.80 " 10-10-10 =
31 29.50 " 5-2½ =
32 65.89 " 35-5-2 =
33 167.20 " 20-10-5 =
34 411.30 " 22½-5 =
35 1566.25 " 30-5-2½ =
36 388.15 " 40-10-10 =
37 505.10 " 10-10-5-2½ =
38 629.23 " 7½-2½ =
39 4100.75 " 15-10-10 =
40 28.35 " 5-10-10-10 =

Division

41 128.43 ÷ 29.5 =
42 962.99 ÷ 37.3 =
43 26.938 ÷ 2.45 =
44 63.824 ÷ 5.75 =
45 610.50 ÷ 7.63 =
46 16.500 ÷ .573 =
47 89.467 ÷ 33.57 =
48 5.462 ÷ 8.65 =
49 3.487 ÷ 6.17 =
50 34.765 ÷ .826 =
51 7250.9 ÷ 659. =
52 7.825 ÷ 9.48 =
53 38.948 ÷ 1.209 =
54 .875 ÷ 42.9 =
55 69.346 ÷ 2.091 =

Assignment No. 15

Special Instructions

Division - Build-up Method Division is often accomplished faster when the "Build-up" or Addition Method is used. The previous method of Division you have learned is sometimes called the Subtractive Method because the quotient is secured by repeated subtraction of the divisor from the dividend.

In the "Build-up" Method the divisor is set on the keyboard and by repeated forward turns of the crank the dividend is built up in the lower dials and as a result, the quotient is secured in the upper dials.

The "Build-up" Method is particularly of advantage when the divisor is the same for several dividends because it can be set once on the keyboard and never removed for each example.

Examples 625 ÷ 25 = 25
775 ÷ 25 = 31
850 ÷ 25 = 34

Set 25 on extreme right of keyboard and move carriage one place to the left in line with the dials where 62 of 625 is to appear. Turn crank forward twice. Lower dials show 50 which is less than 62. If crank were turned three times the lower dials would show 75 which is greater than 62. Never turn the crank so many times that the dividend in the lower dials is greater than that desired.

Move carriage one place to the right and turn crank 5 times. The lower dials show 625, the dividend, the upper dials show the quotient 25 and the keyboard shows the divisor 25. This method is of advantage in proving the division by having all three factors in the machine, if the work has been done correctly. If you had turned the crank 6 times instead of 5 the lower dials would show 650 or 25 more than the required dividend - 625.

For next example clear the dials but not the keyboard. Move carriage one place to the left and add 3 times. Lower dials show 75. Move carriage one place to right and add once. Lower dials show 775, dividend, upper dials show 31, quotient, and keyboard shows 25, divisor. The same routine is then followed for the next example: 850 ÷ 25 = 34.

Division - Percentages You have previously learned in studying discounts that a percentage is expressed as a decimal when using the Monroe Calculator. We express 35% as .35; 12½% as .125; 5¼% as .0525, etc.

Assignment No. 15

Review

1	2
1371.10	7513.89
1229.48	6281.70
782.20	314.20
59.35	16.74
2892.36	9483.22
755.73	136.44
3842.45	3428.65
4721.21	6840.29
2783.29	73.15
1972.48	1226.98
3821.17	385.72
980.42	4710.59
3.85	2.65
8412.75	1833.74
163.92	850.40
38.27	7248.51
8329.16	382.11
7621.69	7419.90
60.28	3748.29
2996.81	52.85
372.56	1983.47
2362.89	1284.50
340.28	72.56
2834.79	2499.88
721.52	12.76

3 $ 52.16 less 65-10-5% =
4 175.90 less 40-5-5 =
5 513.61 less 85-2½ =
6 377.50 less 37½-5 =
7 2544.00 less 90-10-10 =
8 15.85 less 15-10 =
9 69.50 less 42½-5 =
10 100.69 less 33 1/3-10 =
11 51.40 less 10-10-2½ =
12 33.95 less 60-5-5 =

13 1479.0 ÷ 789. =
14 3785.3 ÷ 39.2 =
15 7.694 ÷ 65.0 =
16 .525 ÷ 2.06 =
17 543.65 ÷ 678. =
18 95.474 ÷ 9.03 =
19 7634.8 ÷ 645. =
20 .217 ÷ .497 =
21 36.124 ÷ 40.8 =
22 3.170 ÷ .037 =

Division (Build-up)

23 29774 ÷ 1196 =
24 36366 ÷ 1445 =
25 8481 ÷ 278 =
26 12964 ÷ 477 =
27 9384 ÷ 412 =
28 28846 ÷ 1113 =
29 12795 ÷ 535 =
30 1748 ÷ 106 =
31 4261 ÷ 250 =
32 84964 ÷ 202 =
33 152948 ÷ 5988 =
34 99404 ÷ 3696 =
35 23769 ÷ 1095 =
36 34491 ÷ 1003 =
37 187439 ÷ 6991 =

Division (%)

What % of

38 2375.85 is 1900.45
39 493.72 is 321.50
40 9614.00 is 8891.55
41 7230.40 is 6580.51
42 425.20 is 592.80
43 1152.10 is 890.60
44 354.00 is 400.75
45 119.60 is 644.30
46 644.30 is 790.25
47 1371.25 is 1240.32

Assignment No. 16

Special Instructions

Multiplication - Three or more Factors On the Monroe Calculator it is not necessary to record on paper intermediate results in multiplying three or more factors. At the end of one multiplication copy to the keyboard the result in the lower dials. Then subtract with a backward turn of the crank. If the lower dials clear you prove that you have copied the lower dials result correctly to the keyboard.

Example 6' x 2.87# x 17 pieces x $1.25 cwt. = $3.66. Multiplying 6 x 2.87 = 17.22. Copy to the keyboard this lower dials result and subtract to prove the copy. Then multiply by 17. The result in lower dials is 292.74. Copy this to keyboard and subtract to prove. Multiply by 1.25 per cwt. and final result is $3.66.

Multiplication - Finding Amount of Percentage You have previously learned that a % on the Monroe Calculator is represented by a decimal. Therefore, these problems are easily handled by multiplying the amounts by the percentages expressed as decimals.

Assignment No. 16

Review

1 Oral Review of Decimal Equivalents

2 11435 ÷ 691 =
3 9314 ÷ 625 =
4 1453 ÷ 113 =
5 4655 ÷ 258 =
6 8069 ÷ 442 =
7 6745 ÷ 595 =
8 5354 ÷ 371 =
9 2578 ÷ 151 =
10 6002 ÷ 341 =
11 2943 ÷ 211 =

What % of

12 2890.45 is 2500.28 =
13 3546.10 is 3081.55 =
14 6855.22 is 6588.90 =
15 5030.10 is 4921.00 =
16 891.44 is 755.63 =
17 475.81 is 450.56 =
18 866.45 is 721.30 =
19 2045.10 is 1962.08 =
20 6230.50 is 7500.29 =
21 1860.33 is 2134.50 =

Multiplication (Three or more Factors)

22 15' 7" x 3.56 lbs. x 21 x $4.38 cwt.
23 22' 5" x 4.2 " x 32 x 4.38 "
24 20' 6" x 3.5 " x 15 x 4.45 "
25 17' 8" x 4.7 " x 24 x 4.62 "
26 19' 0" x 5.1 " x 18 x 4.80 "
27 8' 9" x 6.7 " x 22 x 4.37 "
28 15' 3" x 5.4 " x 5 x 6.30 "
29 15' 6" x 1.6 " x 17 x 5.20 "
30 0' 9" x 68.7 " x 8 x 4.35 "
31 17' 9" x 4.1 " x 12 x 4.17 "

Percentages

What is

32 25% of 162.80 =
33 2½ of 575.20 =
34 12 of 1260.34 =
35 35 of 899.20 =
36 15 of 630.40 =

What is

37 62½% of 1293.60 =
38 13.4 of 15.75 =
39 20 of 304.80 =
40 7½ of 695.21 =
41 30 of 57.34 =

Assignment No. 17

Special Instructions

Business concerns use percentages in making comparative reports of earnings, sales costs, etc., on a weekly, monthly, and annual basis by salesmen, class of commodity, etc. It is easier for anyone to understand the significance of a percentage figure than to appreciate the same significance in a comparison of dollars and cents which may run into five or six digits or more. For that reason, it is important for you to understand how to figure dollar increases or decreases and the same dollar changes reflected in a percentage.

Amount of Increase or Decrease and % of Either A rule can be established for handling this type of figure work on the Monroe Adding-Calculator. RULE: Always set the latest year, month, or week's figure on the keyboard first. If it is an increase, add the amount in the lower dials. If it is a decrease, subtract the figure from zero in the lower dials. Set the earlier year, month, or week's figure on the keyboard and do just the opposite of what you did with the latest figure. Copy from lower dials the amount of increase or decrease and without clearing the machine, divide keyboard amount into lower dials amount. The % of increase or decrease will appear in the upper dials in decimal form.

	1939	1940	Amount Inc. or Dec.	% Inc. or Dec.
Example a -	1582.61	2963.40	1380.79 Inc.	87.25% Inc.
b -	2731.65	1568.05	1163.60 Dec.	42.60% Dec.

Decimal Set-up:

Upper Dials	5
Keyboard	2
Lower Dials	7

In two examples above, the latest figures are those for 1940. In example (a) you add 2963.40 and subtract 1582.61 which gives you 1380.79 increase which divided by 1582.61 gives 87.25% increase.

In example (b) you subtract 1568.05 and add 2731.65 which gives you 1163.60 decrease which divided by 2731.65 gives 42.60% decrease.

Percentage of Increase - % Only If the amount of increase is not desired, only the percentage, subtraction of the two amounts can be saved by using Build-up Division, previously described.

	1939	1940	% Inc.
Example	369.64	435.75	17.88%

Set 369.64, previous year's figure, on keyboard. With forward turns of the operating crank build up 369.64 to 435.75, or the nearest amount to 435.75. If upper dials decimal is at 5, the answer would be 435.7464176 in the lower dials.

Assignment No. 17

Review

1	2	3	4	5	6
127.80	38.49	175.39	485.39	147.50	37.98
13.40	831.40	3.29	394.10	36.47	134.20
26.21	38.17	38.45	235.75	19.89	272.15
376.78	24.70	91.10	30.87	37.76	380.18
19.10	376.55	370.64	138.11	386.98	13.50
14.13	89.22	13.75	32.17	760.15	380.18
26.21	150.56	98.47	169.30	13.76	30.17
489.76	8.46	1.03	37.99	10.45	9.19
39.21	69.20	9.50	21.85	17.18	27.19
54.18	21.14	88.15	219.14	8.35	258.90

7	21'	8"	x 2.5 lbs.	x 14	x 5.50	cwt.	=	
8	18'	5"	x 5.4 "	x 53	x 5.35	"	=	
9	22'	0"	x 2.25 "	x 35	x 4.40	"	=	
10	15'	6"	x 4.5 "	x 25	x 4.25	"	=	
11	16'	9"	x 2.47 "	x 16	x 5.60	"	=	
12	10'	7½"	x 7.7 "	x 4	x 4.45	"	=	
13	15'	6"	x 2.5 "	x 6	x 5.36	"	=	
14	15'	8"	x 4.7 "	x 14	x 4.38	"	=	
15	7'	10"	x 8.5 "	x 12	x 4.50	"	=	
16	14'	0"	x 6.6 "	x 7	x 5.20	"	=	

	What is			
17	42½%	of	490.61	=
18	35	of	315.81	=
19	27½	of	79.20	=
20	18	of	536.45	=
21	3	of	8971.60	=
22	5	of	6340.50	=
23	22½	of	1799.80	=
24	33	of	2244.55	=
25	75	of	461.30	=
26	40	of	89.75	=

Percentages

Find Amount and % Increase or Decrease

	1939	1940
27	$549198	$579090
28	109063	106939
29	435282	324745
30	693173	710157
31	221470	184135
32	479173	498762
33	184136	188841
34	350558	306264
35	114016	117870
36	870639	728386
37	264041	285153
38	539090	349198
39	153391	285815
40	198714	90914
41	772468	890420

Find % Increase Only

	1940	1939
42	457.85	389.50
43	652.30	605.25
44	106.40	99.32
45	55.80	49.60
46	369.25	175.17
47	2570.46	1981.40
48	513.75	487.23
49	321.60	299.55
50	1833.55	1791.30
51	725.80	687.45

Assignment No. 18

Test No. 3

1

	A	B	C	D	E	F	G
a -	872	823	937	673	324	823	937
b -	346	648	648	967	459	648	765
c -	548	538	523	597	569	538	523
d -	324	695	976	823	368	695	876

2 344 x 32 x 1952 =
3 236 x 14 x 1301 =
4 478 x 25 x 1352 =
5 194 x 19 x 1404 =
6 425 x 61 x 1643 =
7 52.16 less 65-10-5% =
8 175.90 less 40-5-5 =
9 513.61 less 85-2½ =
10 377.50 less 37½-5 =
11 2544.00 less 90-10-10 =
12 128.43 ÷ 29.5 =
13 962.99 ÷ 37.3 =
14 26.938 ÷ 2.45 =
15 63.824 ÷ 5.75 =
16 610.50 ÷ 7.63 =

What % of

17 38.14 is 20.19 =
18 56.42 is 28.71 =
19 172.91 is 95.34 =
20 683.12 is 457.75 =
21 1075.80 is 391.08 =
22 8' 11" x 5.3 lbs. x 7 x 6.30 cwt. =
23 14' 7" x 6.4 lbs. x 21 x 4.80 cwt. =

Find Amount and % of Increase or Decrease

	1939	1940
24	601507.	575821.
25	490275.	583406.
26	118921.	104559.
27	390871.	256320.
28	75690.	88462.

Find % Only Increase or Decrease

	1940	1939
29	222.07	108.77
30	3875.75	3345.22
31	1985.40	1713.50
32	5750.00	4925.16
33	696.81	385.62

Assignment No. 19

Special Instructions

Percentage of Decrease - % Only If amount of decrease is not desired, only the %, subtraction can also be saved. Set earlier figure on keyboard and add in lower dials. Move carriage one place to right and successively subtract until required figure for the latest year, month, or week is reached. This subtraction process is handled in the same manner as build-up division except reversely as to crank turns.

Reciprocal The reciprocal of any number is one divided by that number. For example: 1 ÷ 5 is .2; therefore, the reciprocal of 5 is .2. A reciprocal is useful in saving division where the same divisor is used a number of times because multiplying by a reciprocal of a number produces exactly the same result as dividing by the number. For example: 25 ÷ 5 = 5. If the reciprocal of 5 = .2 then 25 x .2 = 5.

Reciprocals are used extensively in percentage work and in making up decimal equivalent tables for payroll, cost accounting, etc. Common reciprocals used in different lines of business are:

Month of 30 days	.03333
Month of 31 days	.03226
60 lbs. to a Bushel	.01667
One day in a year - 360 day basis	.002778
One day in a year - 365 day basis	.00274
One in a Gross	.006944
One in a Dozen	.08333
One foot in a Mile	.0001894

Monroe Rule for finding Reciprocal

Example Reciprocal of 144 to six decimals

Since the reciprocal of 144 is 1 ÷ 144 prefix a 1 to 144 (1144) and set on extreme left of keyboard. Move carriage to extreme right. Turn crank forward adding amount on keyboard. With zero key release 1 key in extreme left hand column of keys. Without clearing 1 from upper dials divide. Upper dials show 694444. Since almost every reciprocal is a decimal we must have a rule for determining number of ciphers required, if any, after decimal point or if the original number is a decimal we must know how many whole numbers are in the reciprocal.

Cipher Rule for Reciprocals Prefix as many ciphers to the reciprocal as there are whole numbers less one in the original number. If the original number is a decimal, point off as many whole numbers in the reciprocal as there are ciphers in the original number plus one.

The figure 144 having three whole numbers requires two ciphers. Therefore, the reciprocal of 144 to six decimals is .006944.

Assignment No. 19

Review

1	13'	5"	x	2.5	lbs.	x	35	x 4.38	cwt. =
2	9'	2"	x	6.8	"	x	18	x 5.50	" =
3	21'	7"	x	3.7	"	x	22	x 4.59	" =
4	15'	10"	x	5.4	"	x	17	x 3.75	" =
5	22'	1"	x	4.1	"	x	24	x 4.60	" =
6	12'	4"	x	4.2	"	x	23	x 3.45	" =
7	15'	7"	x	6.7	"	x	18	x 4.17	" =
8	22'	9"	x	3.4	"	x	6	x 5.30	" =
9	8'	6"	x	7.7	"	x	14	x 4.38	" =
10	17'	3"	x	2.5	"	x	16	x 4.40	" =

Find Amount and % of Increase or Decrease

	1939	1940
11	353621	295085
12	611450	581200
13	458163	500713
14	676044	405320
15	145647	190548
16	144766	131665
17	181194	172606
18	511362	508178
19	635310	634054
20	99899	95840

Percentages

Find % Increase Only

	1940	1939
21	6.75	5.90
22	89.50	76.15
23	125.16	106.13
24	653.00	321.75
25	96.17	80.19
26	222.07	108.77
27	3875.75	3345.22
28	1985.40	1713.50
29	5750.00	4925.16
30	696.81	385.62

Find % Decrease Only

	1940	1939
31	649.52	731.80
32	562.21	689.30
33	145.06	290.17
34	308.44	413.60
35	220.75	288.30
36	1117.63	1260.45
37	5203.11	6059.18
38	476.29	511.74
39	388.30	406.21
40	650.75	699.07

Reciprocals

Find Reciprocals to five Significant Figures

41	755.85 =	**46**	9.75 =
42	1420.32 =	**47**	321.40 =
43	645.50 =	**48**	4550.17 =
44	27.81 =	**49**	125.16 =
45	5560.00 =	**50**	327.42 =

Assignment No. 20

Special Instructions

Problems 46-47 - Reciprocal These problems require some explanation because this is the first time you have worked what is termed in business, a problem in Distribution. To find the percentages or relation in percentage that each item of a series bears to the total of that series is a problem of Distribution. Particularly if those percentages are multiplied by some other item of Receipts or Sales.

If a distribution problem does not involve percentages the job is called Proration which will be explained in the next assignment.

In both of these problems 46 and 47 the Expense items by departments are first added to obtain total Expense. The total Expense figure is then divided into 100% or 100.00 to obtain the reciprocal. The reciprocal is then set on the keyboard as a constant multiplicand and multplied by the expense figure for each department to arrive at the percentage that that figure bears in relation to the total expense.

Assignment No. 20

Review

Find Amount and % of Increase or Decrease

	1939	1940
1	601507	575821
2	490275	583406
3	118921	104559
4	390871	256320
5	75690	88462
6	459830	385764
7	228407	207321
8	135640	181650
9	720539	648135
10	386117	285014

Find % Increase Only

	1940	1939
11	7315.90	5230.45
12	1128.00	950.59
13	225.00	189.83
14	649.07	507.65
15	87.43	75.50

Find % Decrease Only

	1940	1939
16	449.36	517.62
17	68.50	71.29
18	8903.41	9304.61
19	7148.50	7462.35
20	650.21	693.18
21	4778.33	4907.61
22	169.20	253.04
23	678.45	692.28
24	895.33	907.16
25	5220.89	5575.40

Find Reciprocals to five digits

26	8745.31	=
27	482.65	=
28	.625	=
29	72.	=
30	6405.32	=

Reciprocals

Use Reciprocals for Divisor - Find Answers to two decimals

31	4220	÷ 16	=
32	8460	÷ 16	=
33	5364	÷ 16	=
34	3256	÷ 16	=
35	6452	÷ 16	=
36	3555	÷ 112	=
37	2613	÷ 112	=
38	4303	÷ 112	=
39	5625	÷ 112	=
40	6432	÷ 112	=
41	22520	÷ 196	=
42	15700	÷ 196	=
43	25441	÷ 196	=
44	30255	÷ 196	=
45	36350	÷ 196	=

Assignment No. 20 (Continued)

Use of Reciprocal

Determine % Each Department Expense is of total Expense

46

Department	Expense	Per cent
Commercial	11626	
Traffic	14546	
Plant	34483	
Accounting	16265	
Engineering	25778	
Mechanical	9645	
Service	7074	
Purchasing	10305	
Total		

47

Commercial	11616	
Traffic	19426	
Plant	34483	
Accounting	16223	
Engineering	25778	
Mechanical	9614	
Service	7074	
Purchasing	10556	
Foreign	12763	
Total		

Assignment No. 21

Special Instructions

Distribution and Proration In problem No. 11 we see an example of distribution explained in the previous assignment. The mileage is added and the total mileage divided into 100% to find a reciprocal. The reciprocal is then multiplied by Mileages for Divisions to arrive at percentages due each.

The Proration part of the problem on a distribution basis is found in the multiplication of % due each, times the total receipts, to find the receipts amount due each division.

True proration, examples of which will be found in the next problems No. 12 and 13, consists of dividing the total of a group of figures into an expense item and thus obtaining a factor, which is the equivalent of a reciprocal. This factor is then multiplied by each figure in the group to find the proper proportion of expense that item is of the whole.

In prorations the factors obtained by division should be carried out 5 or 6 decimal places in order that when these factors are multiplied by the group items the results will be accurate enough to add correctly to the predetermined total expense item which is being prorated.

Simultaneous Multiplication and Division Much time can be saved by multiplying the quotient of a division at the same time that the division is being made. One form of such a simultaneous operation is accomplished on the Monroe with "build-up" division.

Example 39 pieces @ $ .68 per dozen = $2.21
Decimal Markers are: 2 places in upper dials
6 and 0 places on keyboard
8 and 2 places in lower dials

NOTE: Double decimal markers are necessary to point off both the quotient and result. The division markers are: upper dials 2 for the quotient, keyboard 0 for the divisor, and lower dials 2 for the dividend. The multiplication markers are: upper dials 2 for the multiplier which is also the quotient, keyboard 6 for the multiplicand, and lower dials 8 for the result.

Set .68 on left of keyboard at decimal marker. Set 12, the number of pieces in a dozen, on right of keyboard. Build 12 on right of keyboard up to 39 at 2nd decimal in lower dials. The upper dials show 3.25 the quotient of dividing 39 by 12. At the same time, 68 on keyboard has been multiplied by 3.25 with result 2.21 in lower dials at 8th decimal.

Assignment No. 21

Review

Use reciprocal for divisor; carry out the reciprocal to six significant figures. Find answer to two decimals.

1	23640 ÷ 2240 =	**6**	14465 ÷ 72 =
2	43730 ÷ 2240 =	**7**	11772 ÷ 72 =
3	35820 ÷ 2240 =	**8**	23868 ÷ 72 =
4	34055 ÷ 2240 =	**9**	24745 ÷ 72 =
5	17070 ÷ 2240 =	**10**	33450 ÷ 72 =

Distribution and Prorating

11

Find % and Amount Due Each Division

Division	Mileage	Total Receipts	% Due Each	Amount Due Each
A	423			
B	234			
C	146			
Total		$9684.75	1.000000	$9684.750

12

Prorate rental Expense 8275.75 according to floor space.

Dept.	Space	Rent
A	2563 ft.	
B	872	
C	461	
D	266	
E	348	
F	1275	
Total		8275.75

13

Prorate Overhead Expense 2376.22 to various Departments. Carry out the reciprocal to six digits.

Dept.	Expense	Overhead
A	$1275.69	
B	1049.38	
C	3434.56	
D	2563.92	
E	2587.92	
F	1776.53	
G	1964.73	
Total		2376.22

Assignment No. 21 (Continued)

Simultaneous Multiplication and Division

14	39	pieces	@	$ .68	per	dozen	=
15	51	"	@	.72	"	"	=
16	44	"	@	.63	"	"	=
17	78	ounces	@	.55	per	lb.	=
18	65	"	@	.45	"	"	=
19	48	pieces	@	.85	per	dozen	=
20	72	"	@	.15	"	"	=
21	96	"	@	.25	"	"	=
22	32	"	@	.12	"	"	=
23	74	"	@	.66	"	"	=
24	78	"	@	.45	"	"	=
25	63	"	@	.50	"	"	=
26	95	"	@	.50	"	"	=
27	30	"	@	.40	"	"	=
28	41	"	@	.12	"	"	=

Assignment No. 22

Special Instructions

Simultaneous Multiplication and Division with Complements Where large numbers are involved it is more practical to use complementary division rather than build-up division, whenever division is combined simultaneously with multiplication.

Complementary division is subtractive division accomplished by adding the complement of the divisor. The complement of the divisor is set on the extreme right of the keyboard and the multiplicand less 1 is set on extreme left of keyboard. These two factors are connected by depressing all 9 keys between them.

Previous assignments have defined and illustrated the COMPLEMENT of a number. To review, the complement of 8 is 2, or 78 is 22, or 36 is 64, or 258 is 742 because the number itself added to its complement will equal 10, 100 or 1000 as the case may be.

Example 1728 pieces @ $.26 per dozen = $37.44
Decimal point at 2 in upper dials
Decimal point at 7 and 0 in keyboard
Decimal point at 9 and 2 in lower dials

Set 1728 on keyboard and add into lower dials at 2nd decimal. Clear upper dials and keyboard. Set .25 at extreme left side of keyboard. This amount represents the price of .26 less 1. At the extreme right of keyboard set 88 which is the complement of 12, number of pieces in a dozen. Connect these two factors by depressing all of the 9 keys between them.

Shift the carriage so that 88 is in direct alignment with 17 of the dividend 1728. Think of 88 as 12 and divide 17 by 12 by turning crank forward one turn. Shift the carriage one place to left and continue to divide by forward turns of the crank.

Final result 37.44 is at left of lower dials at 9th decimal and the number of dozen 144 is in upper dials. While 1728 was being divided by 12 or its complement 88 the price of $ .26 was being multiplied by the quotient 144.

In conclusion, it is recommended that the complementary method of simultaneous multiplication and division be used with large numbers and the "build-up" method be used for small numbers.

Assignment No. 22 (Continued)

Interest - Dial Transfer Method Another method of figuring interest on the Monroe involves the use of an interest table furnished with the Monroe Calculator.

Example Find interest on $3475. for 32 days at 7% on a 360 Day Basis.

Decimals Upper Dials 3, Keyboard 6, Lower Dials 9

Step 1 Set 3475 on right of keyboard. Multiply by 32 at right of upper dials, disregarding 3rd decimal. This gives in the lower dials 111200, principal for one day.

2 Clear upper dials and keyboard. From the 360 day table select rate for one day's interest on $1000 at 7% - .194444 and set that rate on keyboard. Shift carriage until right hand figure on keyboard is under left hand figure in lower dials.

3 With forward turns of crank, transfer 111200 to upper dials. Interest in lower dials is $21.62.

Assignment No. 22

Review

Use Reciprocal for Divisor. Carry result to two decimals.

1 13120 ÷ 36 =
2 14220 ÷ 36 =
3 5250 ÷ 36 =
4 3475 ÷ 36 =
5 12455 ÷ 36 =
6 125.50 ÷ 31 =
7 175.50 ÷ 31 =
8 145.50 ÷ 31 =
9 128.00 ÷ 31 =
10 217.00 ÷ 31 =

12

Prorate Advertising Expense 2575.00

Dept.	Amount	Expense
A	13750.00	
B	4640.00	
C	8250.00	
D	7350.00	
E	19250.00	
F	7365.00	
G	9365.00	
H	6430.00	
J	4400.00	
Total		2575.00

11

Prorate Rent 2500.00 according to floor space.

Dept.	Space	Rent
A	345	
B	153	
C	648	
D	545	
E	475	
F	678	
G	789	
Total		2500.00

13

Distribute Amounts to Departments

Dept.	% of Expense	Expense
A	23.63%	
B	26.44	
C	12.51	
D	33.80	
Total		25365.80

14

Dept.	% of Expense	Expense
A	22.53%	
B	44.16	
C	15.81	
D	7.28	
Total		42186.90

15

A	18.15%	
B	17.72	
C	12.85	
D	54.15	
Total		125,649.20

Simultaneous Multiplication and Division

16 135 pcs. @ .35 per gross =
17 477 pcs. @ .47 per gross =
18 253 pcs. @ .65 per gross =
19 118 pcs. @ .76 per gross =
20 210 pcs. @ .55 per gross =
21 3562 lbs. @ .75 per bu. = (60#)
22 3792 lbs. @ .85 per bu. = (32#)
23 2560 lbs. @ .19 per bu. = (32#)
24 3470 lbs. @ .88 per bu. = (48#)
25 3285 lbs. @ .78 per bu. = (48#)

Assignment No. 23

General Review

1 3324 x 8701 =
2 4657 x 7228 =
3 5144 x 2956 =
4 2367 x 8957 =
5 5605 x 1718 =
6 4135 x 51 x 1562 =
7 3750 x 39 x 1649 =
8 4755 x 33 x 1631 =
9 3882 x 58 x 2135 =
10 1950 x 47 x 2187 =
11 51.85 less 5-5-2½ =
12 305.30 less 50-5-5 =
13 1521.40 less 20-10-10 =
14 690.80 less 32½-10-10-10 =
15 14.40 less 15-10-2½ =
16 43.3672 ÷ 1.97 =
17 .8893 ÷ .234 =
18 122.907 ÷ 654 =
19 63.8 ÷ 78.9 =
20 7.4455 ÷ .56 =

What % of

21 385.13 is 340.55 =
22 790.56 is 745.31 =
23 1483.20 is 1504.26 =
24 3371.40 is 3251.20 =
25 894.26 is 824.91 =

26 23' 2" x 3.7 lb. x 35 x 3.75 cwt. =
27 18' 0" x 5.5 " x 7 x 4.60 cwt. =
28 15' 5" x 2.3 " x 19 x 5.33 cwt. =
29 10'10" x 7.7 " x 12 x 4.38 cwt. =
30 14' 6" x 2.5 " x 8 x 3.70 cwt. =

Find Amount and % of Increase or Decrease

	1939	1940
31	821575	960157
32	153841	114090
33	579558	613173
34	93420	86939
35	241275	319610

Find % Increase Only

	1940	1939
36	273.38	198.76
37	844.29	736.35
38	353.96	218.47
39	182.13	90.85
40	71.10	68.30

Find % Decrease Only

	1940	1939
41	449.36	517.62
42	68.50	71.29
43	8903.41	9304.61
44	7148.50	7462.35
45	650.21	693.18

Use reciprocals for Divisor
Carry Result to two decimals

46 2311.40 ÷ 365 =
47 313.32 ÷ 365 =
48 243.50 ÷ 365 =
49 562.70 ÷ 365 =
50 171.30 ÷ 365 =
51 550.60 ÷ 734 =
52 2570.60 ÷ 734 =
53 1360.00 ÷ 734 =
54 452.30 ÷ 734 =
55 632.34 ÷ 734 =

56

Prorate Rental 8275.75 on Floor Space

Dept.	Space	Rent
A	2563 ft.	
B	872	
C	461	
D	266	
E	348	
F	1275	
Total		8275.75

Assignment No. 23 (Continued)

Distribute Amounts to Departments

57

Dept.	Percentage	Amount
A	34.14%	$
B	13.25	
C	24.12	
D	13.45	
Total		$275.50

58

A	23.63%	$
B	26.44	
C	12.51	
D	33.80	
Total		$1565.80

59	84	pieces	@	$ .58	per	doz.	=
60	27	"	@	.51	"	"	=
61	69	"	@	.42	"	"	=
62	23	"	@	.21	"	"	=
63	87	"	@	.61	"	"	=

64	1575	lbs.	@	.68	per	bu.	(48#) =
65	3340	"	@	.75	"	"	(56#) =
66	5063	"	@	.87	"	"	(32#) =
67	1314	"	@	.93	"	"	(60#) =
68	8870	"	@	.74	"	"	(60#) =

Assignment No. 24

Test No. 4

Find % Decrease Only

	1940	1939
1	4778.33	4907.61
2	169.20	253.04
3	678.45	692.28
4	895.33	907.16
5	5220.89	5575.40

9

Find Reciprocal to Five Significant Figures

6	.625	=
7	756.00	=
8	5585.30	=

10

Determine % each Dept. Expense is of Total Expense

Dept.	Expense	%
Commercial	11626	
Traffic	14546	
Plant	34483	
Accounting	16265	
Engineering	25778	
Mechanical	9645	
Service	7074	
Purchasing	10305	
Total		Total

Prorate Advertising Expense*

Dept.	Amount	Adv. Expense
A	13,750	
B	4,640	
C	8,250	
D	7,350	
E	19,250	
F	7,365	
G	9,365	
H	6,430	
J	4,400	
Total		2575.

21

11	20	pieces	@ .74	per doz.	=
12	12	"	@ .52	" "	=
13	52	ounces	@ .75	per lb.	=
14	18	"	@ .68	" "	=
15	64	"	@ .48	" "	=
16	981	pieces	@ .45	per gross	=
17	339	"	@ .57	" "	=
18	3562	pounds	@ .75	per bu. (60#)	=
19	3792	"	@ .85	per bu. (32#)	=
20	2560	"	@ .19	per bu. (32#)	=

Find % Floor Space for each Dept. and Prorate rental charge based on Floor Space

Dept.	Space	%	Rent
A	345 ft.		
B	153		
C	648		
D	545		
E	475		
F	678		
G	789		
Total			2500.00

*In solving Problem 10, Prorating Advertising Expense, carry out the reciprocal to six significant figures.

Assignment No. 25

Special Instructions

Interest - Long Method Several methods may be used to figure interest on the Monroe Calculator, but all methods are worked around the following formula:

$$\text{Interest - Formula} \quad \frac{\text{Principal x Rate x Days}}{\text{360 or 365}}$$

To explain this formula: THE PRINCIPAL is the amount of the loan or amount of money on which interest is to be figured. THE RATE is the percentage to be charged for the use or loan of money. THE DAYS is the length of the loan or period for which interest must be figured.

These three factors must be multiplied together and the final result divided by either 360 or 365 days, representing the number of days in a year.

Actually there are 365 days in every year except Leap Year which has 366 days. The year 1944 is a 366 day year. But most interest calculations are made on the basis of 360 days in a year, which is easier to figure because in this method each month is considered as a 30-day month.

> **Example** Find interest on $1321. for 56 days @ 7% on a 365 day basis. (All interest problems will be on an even dollar basis so far as principal is concerned.)

Substituting the figures in the above example in the formula previously mentioned we have:

$$\frac{\$1321 \times .07 \times 56}{365}$$

Method of solution is as follows:

Decimals Upper Dials 5 - Keyboard 0 - Lower Dials 5

Step 1 Set 1321 on right of keyboard and multiply by .07 at 5th decimal in upper dials. The result 92.47 at 5th decimal in lower dials is the interest for one year. Clear upper dials only.

2 Set 365 at right of keyboard and divide into 92.47. The result .25334, interest for one day, appears in red in upper dials. Clear lower dials and keyboard.

3 Set the days 56 on right of keyboard and multiply by the red figure in upper dials. The interest $14.19 appears in lower dials.

Assignment No. 25

Invoices

1

8	Dining Tables	#551	@	$24.75	each =
24	Dining Chairs	#412	@	6.35	" =
9	Oak Rockers	#435	@	8.85	" =
15	Library Tables	#132	@	11.75	" =
7	Oak Desks	#446	@	13.75	" =
6	Chairs	#380	@	9.50	" =
12	Chairs	#165	@	7.25	" =
				Gross	$
				Less 2 %	
				Net	$

2

6	Oak Center Tables	@	$ 8.56	each =
2	Rockers	@	4.75	" =
5	Doz. Dining Chairs	@	7.60	" =
1	Mahogany Center Table	@	35.50	" =
6	Kitchen Tables	@	6.35	" =
5	Kitchen Cabinets	@	15.70	" =
			Gross	$
			Less 5-2%	
			Net	$

3

1/3	Gross Mogul Pencils	@	$ 4.50	gross =
1 2/3	Doz. Erasers	@	3.75	dozen =
2 1/3	Doz. Black Ink	@	19.00	" =
2	Gross Pens	@	.90	gross =
3 2/3	Doz. Folders	@	1.35	dozen =
			Gross	$
			Less 33 1/3%	
			Net	$

4

126 5/8 yds.
317 3/8 "
61 1/8 "
514 1/4 "
198 3/4 "
_____ yds. @ $13.27 per yd. = $

5

312 1/8 yds.
145 3/8 "
312 4/8 "
56 7/8 "
61 3/8 "
_____ yds. @ $25.61 per yd. = $

Assignment No. 25 (Continued)

6

126 5/8 yds.
317 3/8 "
61 1/8 "
514 1/4 "
198 3/4 "
_____ yds. @ $2.15 per yd. = $

7

560 Gross Screws @ $ .89 Gross
Less 60-20-10-5% =
35 Kegs Nails @ 6.75 Keg
Less 67½-10-5% =
286 Lbs. Galv. Sheets @ 12.50 cwt.
Less 70-20-5-2½% =
485 Lbs. Wire @ 6.45 cwt.
Less 50-10-5% =
165 Lbs. Washers @ .11¼ lb. =

Interest

Find Amount of Interest on 360 Day Basis

	Principal	Time	Rate	Interest
8	$ 7429	31 Days	7%	=
9	5360	26 "	4¼	=
10	18750	18 "	8½	=
11	6175	40 "	5	=
12	22480	83 "	2	=
13	3425	64 "	8	=
14	8651	58 "	5½	=
15	14930	32 "	7	=
16	12274	43 "	4	=
17	9583	88 "	6½	=

Assignment No. 26

Special Instructions

Textile Invoice No. 5 The small figures shown in the yardage figures such as 41^{3} etc. represent quarter yards. In other words, 41^{3} yards is 41 3/4 yards.

Creamery and Dairy These problems involve a basis used by Dairies for figuring payment required for milk or cream based on a fixed price per pound for butter fat. Therefore, the problem becomes a three way multiplication and by Monroe machine method, we suggest using the dial transfer principle previously explained.

Assignment No. 26

Review

1

3 1/6	Gross Cans Peas	@ $6.35	gross	=
44	Cans Asparagus	@ 2.35	dozen	=
8 5/6	Dozen Cans Plums	@ 1.42½	"	=
54	Cans Tomatoes	@ .52½	"	=
3 2/6	Dozen Apricots	@ 1.95	"	=
			Gross	$
			Less 10-10-5%	
			Net	$

2

8 4/6	Dozen Cans Sardines	@ $1.45	dozen	=
11 3/6	Dozen Cans Rhubarb	@ 2.35½	"	=
4 5/6	Dozen Cans Plums	@ 1.48	"	=
74	Cans Peas	@ .85	"	=
25	Cartons Cigarettes	@ 1.35	each	=
			Gross	$
			Less 25-10%	
			Net	$

3

5	Boxes Soap	@ $3.15	box	=
6	Bbls. Sugar	@ 7.85	C lbs.	=
	362 - 349 - 354			
	365 - 368 - 359			
5	Tubs Butter	@ .28½	lb.	=
	50-11, 49-10, 52-12			
	54-13, 55-9			
3 1/6	Dozen Corn	@ 6.35	gross	=
8 5/6	Dozen Peas	@ 1.15	dozen	=
15 7/12	Dozen Salmon	@ 17.50	gross	=
			Gross	$
			Less 5%	
			Net	$

Accumulate each invoice - Do not extend each item.

4

4503¾	yards	@ $ .14 3/8	per yard	=
3248	"	@ .12 7/8	" "	=
2340	"	@ .09 1/2	" "	=
8648	"	@ .87	" "	=
			Gross	$
			Less 7%	

Less 25006# @ $ .17¾ cwt.

Net $

Assignment No. 26

5

10 Pieces Percale

$41^3 - 35^2 - 39^1 - 34^2$
$40 - 36^1 - 35^3 - 33^2$
$40 - 37^1$

@ $ .08¼ per yard = $

6

180	lbs.	Beef	@ $	.18	lb. =
24	"	Pork Sausage	@	.15	" =
32	"	Pork Loins "a"	@	.19	" =
45	"	Smoked Ham	@	.21	" =
60	doz.	Eggs	@	.58	doz. =
25	lbs.	Swiss Cheese	@	.36	lb. =
72	"	Corned Beef	@	.22	" =
12	"	Hog Casings	@	.90	" =
2	doz.	Catsup	@	1.65	doz. =
375	lbs.	Glue	@	.07	lb. =
16½	"	Boiled Ham	@	.33	" =
200	"	Pure Bone Fert.	@	2.75	cwt. =

Find Interest Amount on 360 Day Basis

	Principal	Time	Rate	Interest
7	$8652	42 Days	3%	$
8	1774	29 "	4½	
9	9938	24 "	5	
10	2833	16 "	2	
11	16785	78 "	7	
12	5296	34 "	5½	
13	5810	17 "	8	
14	14220	25 "	4	
15	15539	49 "	3½	
16	3780	65 "	7	

Creameries and Dairies

	Pounds		Test		Price per Lb.		Amount
17	27	x	26½	x	$.48	=	$
18	102	x	33	x	.465	=	
19	98	x	47½	x	.49	=	
20	73½	x	38	x	.50	=	
21	45½	x	30½	x	.515	=	
22	63.4	x	29½	x	.51	=	
23	85.6	x	32	x	.51	=	
24	91.3	x	37½	x	.525	=	
25	27½	x	28	x	.48	=	
26	39	x	27½	x	.465	=	

Assignment No. 27

Special Instructions

Contracting The first job is to find the cubic feet in a three way multiplication which should not be done by dial transfer method. The feet and inches are set up as whole numbers and decimals. The first dimension multiplied by the second. The result is copied to keyboard and subtracted to prove transfer to keyboard. Then multiply by the third dimension. The result is then divided by 27, because there are 27 cubic feet in one cubic yard. The price is then set on keyboard and multiplied by the red figures in the upper dials, which are the number of cubic yards.

Iron and Steel Complementary simultaneous multiplication will save a lot of time with these problems and that method must be used instead of the "build-up" method due to the size of the numbers involved.

The number of pounds in a Gross Ton is 2240. Therefore, the complement to use is 7760 separated with depressed 9 keys from the price less one set on left of keyboard.

Assignment No. 27

Review

1

12 Pieces Gingham

39^{1} - 39^{1} - 40^{2} - 39^{3}
40^{2} - 41^{2} - 45^{1} - 44^{1}
46 - 44^{1} - 40^{3} - 42^{2}

@ $.09 3/4 yard = $

2

8 Pieces Cotton Crepe

35^{1} - 37^{2} - 38^{1} - 36
38^{3} - 35^{3} - 36^{2} - 37^{1}

@ $ .10 5/8 yard = $

3

275 Yards @ $.15½ =
159¼ " @ .22¼ =
905½ " @ .06¾ =
267¼ " @ .24¼ =
Gross $
Less 12½%
Net $

4

550 lbs. Nails	@ $3.40 cwt.	= $
24 Pieces Pipe 12'7" Long	@ .08¼ ft.	=
7 Pieces Pipe 6'6" Long	@ .12½ ft.	=
2 Gross 5½ doz. Files	@ .07½ ea.	=
60 Screw Drivers	@ 2.25 doz.	=

Find Amount of Interest on a 360 Day Basis

	Principal	Time	Rate		Interest
5	$3475	16 Days	2%	=	$
6	8640	32 "	4½	=	
7	7486	47 "	6	=	
8	349	89 "	7	=	
9	2755	51 "	3	=	

Assignment No. 27 (Continued)

	Pounds		Test		Price per Lb.	Amount
10	42	x	41	x	$ .47 =	$
11	47½	x	46	x	.485 =	
12	103.4	x	30	x	.49 =	
13	81	x	33½	x	.505 =	
14	67½	x	29½	x	.51 =	

Contracting

15	45'	9"	x	7'	6"	x	15'	0"	x	$1.64	per	cu.	yd.	= $
16	56'	0"	x	32'	0"	x	4'	0"	x	2.07	"	"	"	=
17	125'	0"	x	25'	6"	x	6'	6"	x	1.33	"	"	"	=
18	3'	6"	x	1'	9"	x	2'	3"	x	1.51	"	"	"	=
19	17'	3"	x	18'	9"	x	10'	9"	x	2.08	"	"	"	=

Iron and Steel

20	80903	lbs.	@	$3.65	per	gross	ton	= $
21	128334	"	@	9.55	"	"	"	=
22	107893	"	@	3.45	"	"	"	=
23	64875	"	@	6.85	"	"	"	=
24	76531	"	@	8.75	"	"	"	=

Note: On tonnage problems consider 2240 pounds as 224, and the complement, 7760, as 776, allowing for dropping the ciphers in decimals.

Assignment No. 28

Special Instructions

Department Stores The difference between cost and selling price of any article is termed the amount of or dollar mark-up. The per cent of mark-up is determined by dividing the dollar mark-up by the retail or selling price. (On any Monroe Calculator having two sets of upper dials, the % of mark-up can be secured by dividing the retail or selling price into the cost price, without obtaining the amount of or dollar mark-up.)

Example Cost $21.75 - Retail $39.50 - What is % mark-up?

Decimals Upper Dials 3 - Keyboard 2 - Lower Dials 5.

Step 1 Set 21.75 on keyboard and subtract from 5th place in lower dials.

2 Set 39.50 on keyboard and add. The result in lower dials is 17.75 or dollar mark-up.

3 Divide keyboard set-up into lower dials amount. Result in upper dials is .449 or 45% mark-up.

4 For a mark-down % where articles are sold for less than original selling price, subtract actual selling price, add original selling price and divide as above.

Insurance When an Insurance Company cancels a policy the cancellation is termed a pro rata cancellation and the amount of Returned premium to be sent the policyholder is figured on a pro rata basis. In this connection, a table of decimal equivalents of days in a year is furnished with the Monroe Calculator.

Example Policy $7500 @ 1.59 per C = $119.25 Premium.
Written June 4, 1939, cancelled March 19, 1940
One Year Policy - Return Premium $25.16
Find Premium and return premium

Decimals Upper Dials 2 - Keyboard 4 - Lower Dials 6

Step 1 Set 7500 on keyboard as 75.00 around 4th decimal. Multiply by 1.59 around 2nd decimal in upper dials. Lower dials show 119.25 premium. Clear entire machine.

2 Set expiration year (40) and decimal equivalent for month and day secured from table .4247 on keyboard and add in lower dials at 6th decimal.

Assignment No. 28 (Continued)

Step 3 Set cancellation year (40) and decimal equivalent for month and day .2137 on keyboard and subtract.

4 Lower dials show .2110 decimal part of year policy has yet to run

36.4247
36.2137
.2110

5 Set .2110 on keyboard and subtract from lower dials to prove transfer to keyboard. Multiply by premium $119.25. Return premium $25.16 is in lower dials.

Assignment No. 28

Review

1 34' 6" x 5' 0" x 12' 6" x $3.19 per cu. yd. = $
2 65' 0" x 28' 6" x 6' 0" x 3.07 " " " =

Department Stores

Find Mark-up %

	Cost		Retail		Mark-up %
3	$22.83	÷	$36.45	=	
4	15.73	÷	18.94	=	
5	7.43	÷	11.25	=	
6	8.67	÷	9.48	=	
7	11.88	÷	17.36	=	

Insurance

Find Premium and Return Premium

	Written	Cancelled	Policy	Rate
8	Apr. 20, 1939	Dec. 15, 1939	$85000	$ .945 per C
9	July 19, 1939	Apr. 7, 1940	1250	.73 " "
10	June 4, 1939	Jan. 23, 1940	9500	1.69 " "
11	May 13, 1939	Mar. 29, 1940	3600	.45 " "
12	Mar. 10, 1939	Dec. 4, 1939	15500	.785 " "

Assignment No. 29

Special Instructions

Lumber To figure board feet in a piece of lumber, multiply the width x thickness x number of pieces and divide by 12. Or you can determine board feet by looking at a Lumber Table which is furnished with the Monroe Machine.

Example 29 Pieces 3" x 6" -16' Long @ $28.50 per M = $19.84. Use Lumber Table.

Decimals Upper Dials 2 - Keyboard 3 - Lower Dials 5

Step 1 Table for 3" x 6" -16' shows 24.000 feet. Set 24.000 in keyboard. Multiply by number of pieces 29. Lower dials at 5th decimal show 696 feet.

2 Copy 696 to keyboard as .696. Subtract from lower dials to prove transfer.

3 Multiply by 28.50. Lower dials show 19.836 or $19.84 result.

Department Stores The principle of double multiplication previously discussed in earlier assignments where one amount is multiplied by two others simultaneously, is very useful in checking a department store invoice and simultaneously figuring the retail amount of the invoice. This principle can also be used in inventory in accumulating cost and retail in one operation.

Example The following invoice must be checked as to total and the total selling price determined.

		Selling Price
27 Items @ $.19 =	$5.13	$.25
33 Items @ .17 =	5.61	.25
21 Items @ .16 =	3.36	.25
	$14.10	Total Retail
		$20.25

Decimals Upper Dials 2 - Keyboard 7-2 - Lower Dials 9-4

Step 1 Set on left of keyboard .19 and on right .25. Multiply by 27. Do not clear lower dials, only upper dials.

2 Set .17 on left and .25 on right of keyboard. Multiply by 33. Clear upper dials.

Assignment No. 29 (Continued)

Step 3 Set .16 on left and .25 on right of keyboard. Multiply by 21.

4 Lower dials at left show 14.10 which checks invoice. On right of lower dials is 20.25 total retail.

Railroad Problems #20 and #21 are Prorating problems similar to those described in previous assignments. Total miles are divided into Revenue. The factor obtained is then multiplied as a constant multiplicand by mileage for each railroad to obtain proportionate revenue for each road.

Assignment No. 29

Lumber

1	29	pieces	3" x 6"	-	16'	@	$28.50	per M =	$
2	56	"	2" x 4"	-	18'	@	32.45	" " =	
3	346	"	2" x 8"	-	20'	@	36.00	" " =	
4	75	"	2" x 6"	-	14'	@	45.00	" " =	
5	38	"	2" x 4"	-	16'	@	47.00	" " =	

6	335	Bdls.	(15	Sets	per	Bdl.)	23 1/2"	Hds.	@	$.11 1/4	per	Set =	$
7	197	"	(20	"	"	")	17 1/8"	"	@	.09 1/8	"	" =	
8	217	"	(20	"	"	")	14 1/2"	"	@	.08 1/4	"	" =	
9	325	"	(20	"	"	")	19 1/8"	"	@	.08 1/4	"	" =	
10	213	"	(15	"	"	")	19 1/8"	"	@	.10 7/8	"	" =	

Department Store

Check Invoice, write Yes or No as to Accuracy and show Total Retail Value

				Invoice Amount	Selling Price	Total Retail
11	16	items	@ $.21		$.35	
	33	"	@ .39		.49	
	19	"	@ .37		.45	
	37	"	@ .26 = $38.22		.34	$
12	27	"	@ .17		.35	
	63	"	@ .19		.35	
	29	"	@ .15		.25	
	35	"	@ .14 = $25.81		.25	$
13	17	"	@ .26		.39	
	16	"	@ .26		.39	
	23	"	@ .39 = $15.77		.69	$
14	26	"	@ .11		.15	
	79	"	@ .09		.13	
	84	"	@ .06 = $15.10		.09	$

Assignment No. 29 (Continued)

Railroads

	Tons		Miles		Ton Miles	Earnings	Rate per Ton Mile
15	11.6	x	173	=		$334.61	
16	14.3	x	214	=		397.04	
17	5.9	x	334	=		119.55	
18	204.3	x	619	=		1044.73	
19	71.8	x	83	=		94.77	

Figure proportion of Revenue for each road

	Road	Miles	Revenue
20	**A**	204	
	B	97	
	C	103	
	Total	404	$107.52
21	**A**	137	
	B	164	
	C	219	
	Total	520	$219.54

Assignment No. 30

Test No. 5 - Final

1

2/3	Gross	H. B. Pencils	@	$12.50 Gross	= $
3	"	Pens	@	1.15 "	=
2 1/2	Doz.	Erasers	@	4.35 Doz.	=
1/4	"	Red Ink	@	21.25 "	=

2

12	Lbs.	5	oz.	Spice	@ $2.00 lb.	=
7	"	11	"	"	@ 1.42 "	=
16	"	3	"	"	@ 1.51 "	=
276	"	5	"	"	@ .195 "	=
37	"	13	"	"	@ .866 "	=

3

312 5/8
145 7/8
51 2/8
156 3/8
451 5/8
_____
yds. @ $12.67½ per yd. = $

4

115 1/8 yds. @ $1.16
416 3/8 " @ 1.12 1/2
377 5/8 " @ 1.25 1/4
425 7/8 " @ 1.33 1/3
116 1/8 " @ 1.02 1/2
Gross $
Less 2 1/2%
Net $

5

550 Lbs.	Nails	@ $3.40 cwt.	= $
24 Pieces	Pipe 12' 7"	@ .08¼ ft.	=
7 Pieces	" 6' 6"	@ .12½ "	=
2 Gross 5½	Doz. Files	@ .07½ ea.	=
60	Screw Drivers	@ 2.25 doz.	=

Assignment No. 30 (Continued)

	Principal	Time	Rate	Interest
6	$2468	47 Days	4% =	$
7	1879	25 "	6 =	
8	2400	94 "	3 =	

9 26' 11" x 7' 11" x 7' 8" x 1.38 per cu. yd. = $

10 17' 5" x 6' 3" x 11' 6" x 1.75 " " " =

	Pounds	Test	Lbs. Butter Fat	Price	Amount
11	81	33½		$.505 per lb. =	$
12	67½	29½		.51 " " =	

Find % Mark-up

	Cost	Retail	% Mark-up
13	95.48	112.13 =	
14	61.53	76.80 =	
15	212.89	300.00 =	

Check Cost and Figure Retail

		Invoice Amount	Selling Price	Total Retail
16	33 items @ $.41		$.59	
	31 " @ .42		.59	
	7 " @ .48	$29.91	.59	$
17	18 " @ .13		.19	
	29 " @ .13		.19	
	64 " @ .12	$13.77	.15	$

Find Premium and Return Premium

	Written	Cancelled	Policy	Rate	Premium	Return Premium
18	Feb. 10, 1939	Oct. 15, 1939	4500	$ .67 per C		
19	July 22, 1939	Nov. 4, 1939	5200	1.75 " "		

Assignment No. 30 (Continued)

20	102571	lbs.	@	$9.45	per	gross ton	= $
21	88685	"	@	8.75	"	" "	=
22	34358	"	@	2.55	"	" "	=

Find Board Feet and Amount

23	81	Pieces	1" x	8"	-20'	=	@ $23.70	per M = $
24	20	"	3" x	8"	-18'	=	@ 52.45	" " =
25	27	"	2" x	10"	-16'	=	@ 20.65	" " =

	Pass.	Miles		Pass. Miles	Earnings		Rate per Pass. Miles
26	149	101	=		$ 468.02	= $	
27	203	98	=		507.21	=	
28	729	216	=		3724.08	=	

Figure proportion Revenue for each Road

		Miles	Revenue
29	**A**	113	
	B	102	
	C	96	
	Total	311	$204.41

Figure % Mileage for each Road

		Miles	%
30	**A**	325	
	B	41	
	C	19	
	Total	385	100.00%

Achievement Norm Sheet

Monroe Office Practice Courses

Educator and other Models

Explanation

All assignments in Monroe Office Practice Courses for the Educator and for other models of the Monroe Adding-Calculator are rated for 40-minute class periods. It is desirable, however, that students have goals to achieve in accomplishing each assignment in less than 40 minutes.

The time standards, or norms, given below are goals for students to aim at and do not include time taken for class discussion, etc., since they only provide for actual machine operation. Any student who reaches these standards will be rated at the top of the class.

Operating Time Standards

Assignment Number	Average Time in Minutes	Best Time in Minutes	Assignment Number	Average Time in Minutes	Best Time in Minutes
1	20	15	**16**	20	15
2	22	18	**17**	29	19
3	24	18	**18**	23	18
4	24	18	**19**	28	23
5	27	20	**20**	31	25
6	25	20	**21**	22	18
7	28	20	**22**	24	19
8	22	16	**23**	37	33
9	23	18	**24**	21	17
10	25	20	**25**	22	18
11	25	19	**26**	28	23
12	22	15	**27**	21	17
13	21	15	**28**	11	8
14	28	18	**29**	19	14
15	31	25	**30**	35	30

MONROE

A DIVISION OF THE BUSINESS MACHINES GROUP OF LITTON INDUSTRIES